A CHILTON PUBLICATION

Iron Age

E NATIONAL METALWORKING WEEKLY

June 26, 1952

OF MICHIGAN
26 1952
ENGINEERING
LIBRARY

ENTS PAGE 2

STEPPED-UP PRODUCTION

Greatly-enlarged plant facilities at Lima mean more Ohio Rolls to enhance your production. Choose from 11 types of Ohio Iron and Steel Rolls:

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Holl-O-Cast Rolls
Chilled Iron Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Flintuff Rolls
Ohio Double-Pour Rolls

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • PLANTS AT LIMA AND SPRINGFIELD, OHIO

WORM GEARING—universal in its application—affords advantages for almost every power transmission job. Select worm-gear units to meet your need from the complete Cleveland line. Write now for new 180-page Catalog 400, just off press.

Photo of Michigan Crane & Conveyor parts-loader in the Commonwealth Industries, Inc., plant at Detroit, by courtesy of The Iron Age.

CLEVELAND helps increase furnace output 10%

DRIVING a conveyor that loads small parts into a continuous heat treat furnace 24 hours a day is punishing service. That's why Commonwealth Industries turned to a long-lasting, trouble-free Cleveland. Set up to maintain a steady, sure furnace-feeding pace, Cleveland helped increase furnace output 10% in one year's time. In addition, labor-savings of $17,500 were realized over the same year's period.

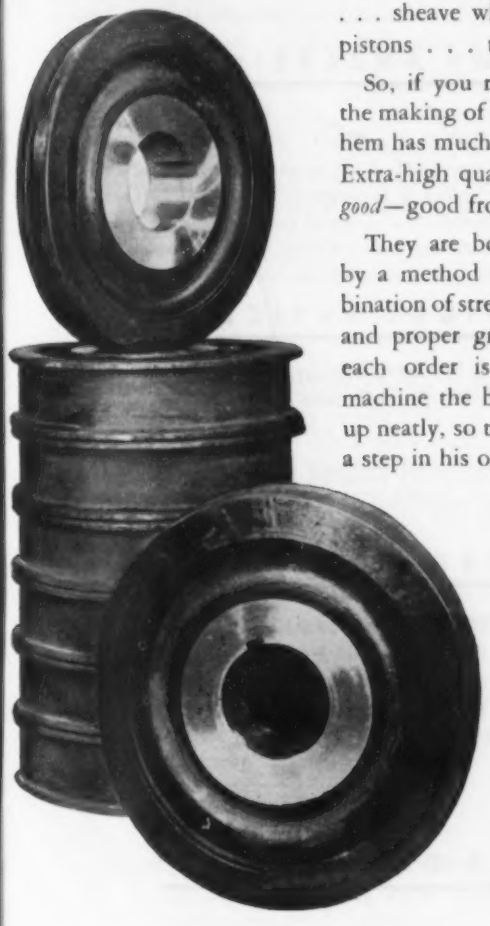
Wherever Clevelands serve—and you'll find them in most industries—engineers will tell you that Clevelands do their work under heavy loads, continuously or intermittently, no matter how severe the conditions, with a minimum of attention.

In or near your city, there's a Cleveland engineer ready to serve you. He will be glad to discuss your power transmission problems and suggest proper drives to meet your particular needs. The Cleveland Worm and Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

The steel blanks with an almost endless *VARIETY of USES*

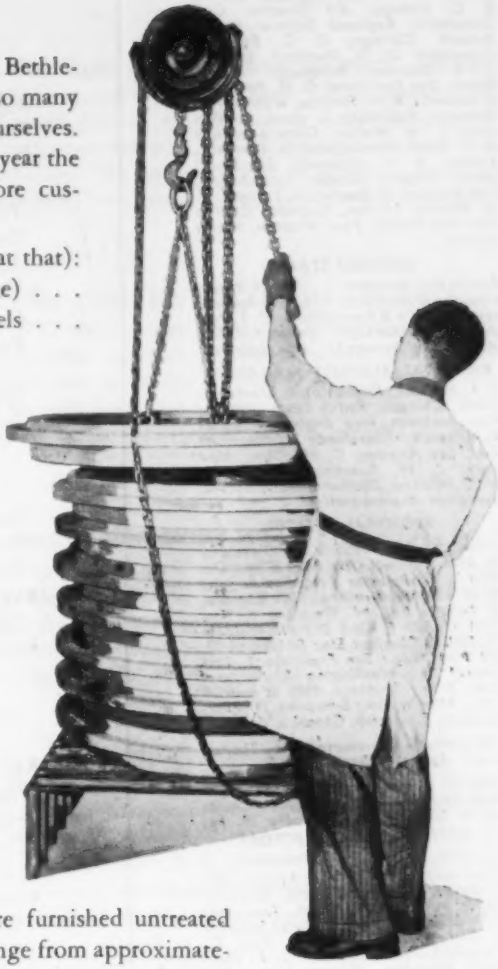


There are so *many* uses for Bethlehem circular steel blanks—so many we may not know them all ourselves. But we do know that every year the number grows larger, as more and more customers find new applications.

Here's a partial list (and very partial, at that): Gears (spur, bevel, miter, herringbone) . . . crane-track wheels . . . industrial wheels . . . turbine rotors . . . flywheels . . . motor brake wheels . . . clutch drums . . . sheave wheels . . . locomotive pistons . . . tire molds and rings.

So, if you require steel blanks in the making of your products, Bethlehem has much to offer. Nice variety. Extra-high quality. These blanks are *good*—good from rim to rim.

They are both forged and rolled by a method that produces a combination of strength, uniform density, and proper grain flow. And before each order is shipped, we rough-machine the blanks and clean them up neatly, so that the customer saves a step in his own plant.

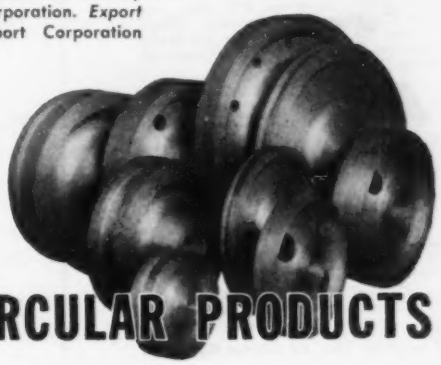


Bethlehem blanks are furnished untreated or heat-treated; sizes range from approximately 10 to 42 in. OD. Care for more details? We'll gladly supply them at your convenience.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL



BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS

IRON AGE

JUNE 26, 1952
VOL. 169, No. 26

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THE IRON AGE

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One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

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Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, $15; other Foreign Countries, $25 per year. Single Copies 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cable address "Ironage" N. Y.

Audit Bureau of Circulations

Society of Business Magazine Editors

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DIGEST

of the week in metalworking

GOBBLE UP CHEAPEST NATURAL RESOURCES

PAGE 55

Growing American industrialization means heavier use of natural resources. The President's Materials Policy Commission warns that digging deeper and toiling harder to get leaner minerals, fuels will add to cost of raw materials. This is dangerous. It means we'd better get smart or get hurt.

STEEL STRIKE HITS DEFENSE PRODUCERS

PAGE 57

Reports of cutbacks in manufacturing were mounting as the steel strike began to exert a painful squeeze on supply. Hardest hit were defense producers. Shortages of certain critical items offset otherwise sound inventories. The plants suffering make mortars, tanks, bazookas, shells, other war items.

GARY STEEL MILL TAKES SLEEPING PILL

PAGE 58

Strikebound Gary works of U. S. Steel was a ghost plant. Its steelmaking capacity of 6 million tons per year was kept under wraps. Blast furnaces were handled delicately as were coke ovens to protect their linings. Openhearths have been shut down completely and damage is now beginning.

IS UNION PLANNING SPLIT AND CONQUER?

PAGE 59

Neither union nor industry seemed willing to yield on the union shop issue that ruined negotiations. Top men of both bargaining teams were in New York but the effort was fruitless. Union strategy may be massing around divide and conquer tactics. It used this successfully in the '49 strike.

DIESEL TRUCKS CLOSE IN AT FAST CLIP

PAGE 74

Once the highway's ugly duckling, the diesel-powered truck is making a serious bid for leadership with freight haulers. Its rise is meteoric. In the heavy duty bracket, proportion of diesels has jumped from 5 pct to 22 pct since 1946. Advantages are seen in long hauls, smoke elimination.

STRIKE SHRINKS WEST COAST STEEL STOCKS

PAGE 83

As the steel strike went into its fourth week, western manufacturers watched their supplies of steel dwindle. Auto assembly plants, smaller fabricators were the worst hit. Diversion of steel to defense producers was expected at any time. Stocks of most warehouse items stayed at 30-day levels.

WILL LIFT BAN ON UNRATED TOOL ORDERS

PAGE 86

Early in July NPA order M-41 will be amended to permit machine tool builders to make machines for un-rated customers—but only when this doesn't interfere with defense schedules. The industry points out a hitch: Sometimes dates specified by contractors for defense are overly unrealistic.

17CR STAINLESS REPLACES 18-8 IN WELDING

PAGE 97

17 Cr stainless steels properly handled show as good corrosion resistance as 18-8 in welded parts. Ferrite grain growth and martensite will reduce joint properties but both can be controlled. Titanium stabilized 17 Cr, Type 430 Ti, is easier to control when right welding practice is used.

CONTINUOUS FILING IS LOW COST OPERATION

PAGE 108

Continuous filing is at least 9 times faster than hand filing, 3 times faster than jig filing, and more accurate than either. It often replaces heavier equipment in stock removal work. Minimum operator training is needed. Short angle files give high removal rates on materials other than steel.

SHELL MOLDED STAINLESS VALVES, FITTINGS

PAGE 112

Stainless valves and fittings are being shell molded in a production setup at Cooper Alloy Foundry. An increase in metal yield of 20 to 35 pct plus better tolerance, smoother finish, no cleaning problems and cleaner working conditions are paying off. No mold backup is used in pouring.

STEEL LOSS NEARS 10 MILLION NET TONS

PAGE 149

Loss of steel output because of the current wage deadlock will reach 9.5 million ingot tons by the end of the week. Another week of strike will make cutbacks in manufacturing start coming thick and fast. Some defense and other manufacturing has already been cut back on a limited scale.

CHEAPER METHOD SALVAGES ALNICO METALS

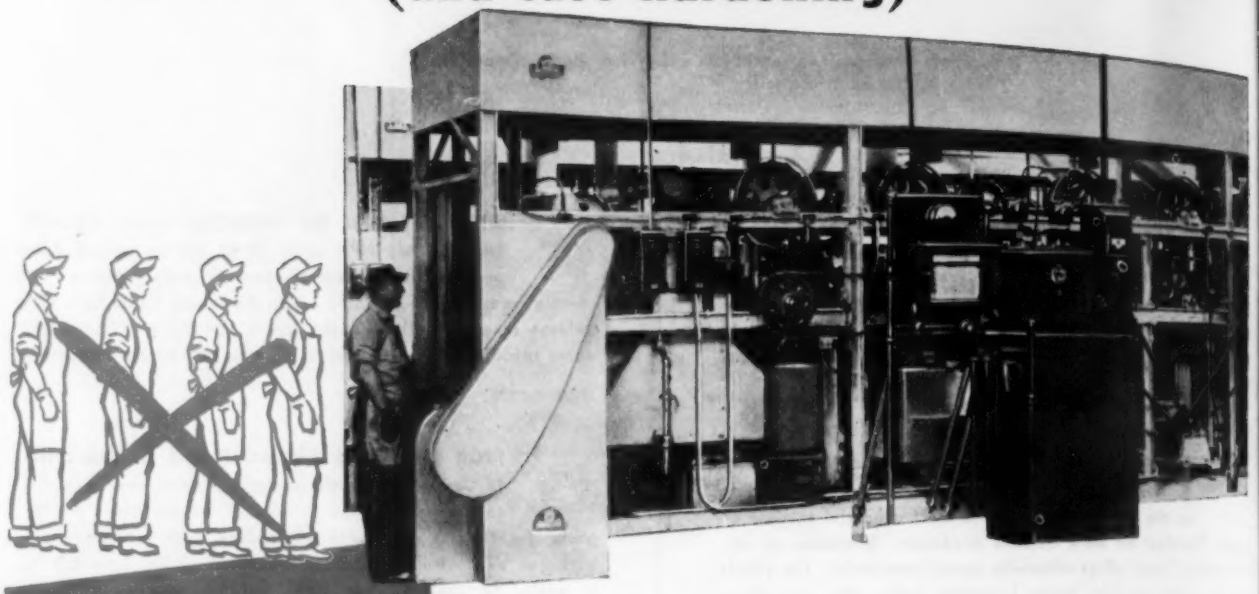
NEXT WEEK

A practical method of recovering nickel, cobalt and copper from the waste dumps of permanent magnet manufacturers promises to pay off handsomely in lower costs. These wastes, grindings and metal particles in a highly refractory slag are cleaned, sorted, remixed, melted and cast for reuse.

CUT COSTS WITH THE

Fastest Carburizing

(and case hardening)



Labor Cost Reduced 80%

...by these two mechanized lines using Ajax Salt Baths for carburizing compressor parts in plant of prominent manufacturer of electric refrigerators.

More economical . . . is the fastest method of producing a specified case depth—for example, a case of 0.040 in. can readily be produced in 2 hours . . . No boxes or retorts to pack and unpack or to heat as dead loads.

Less distortion . . . temperature uniformity throughout bath guaranteed within 5°F. . . . less subsequent grinding . . . permits more shallow case depths.

Closer control of depth and other properties of the case.

Selective carburizing simplified by immersing only portions of work to be treated.

Eliminates usual reheating operation . . . work quenched directly from carburizing bath.

Extreme flexibility . . . several batches may be case hardened simultaneously—each to a different case depth.

No "oxygenation" of the case, with attendant pitting and spalling, as frequently occurs in gas or pack carburizing.

Readily adaptable to mechanization for efficient, low-cost mass production.

Combines with martempering . . . for best control of distortion . . . by an isothermal salt bath quench directly after carburizing.

Brazing can be performed simultaneously . . . both carburizing and brazing done with one heating of the work. Brazing cost—nothing.

Low maintenance costs . . . plain steel pots have a life of 1 to 3 years.

390 Lbs. of Work an Hour

. . . from an Ajax furnace no larger than your desk!

180 lbs. of metal body screws per charge are case hardened (0.004" to 0.010") as required.

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World's largest manufacturer of electric heat treating furnaces exclusively

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AJAX HULTGREN ELECTRIC SALT BATH FURNACES

The Iron Age
FOUNDED 1855

The Union Shop

IF THE union shop had not been part of Phil Murray's demands the steel impasse would have been settled long ago. Even if it had been a demand and the WSB had not meddled in it there might have been no strike. If Mr. Truman had not endorsed the WSB recommendations for labor in toto we would not have become involved in the steel mess.

Those are important "ifs." What is more important is the stand steel firms have taken on the union shop. Once granted the next step would be a closed shop and more union power to dictate which men could or could not work in the steel mills.

The union shop is basically un-American. It means that any man who does not join the union in a certain period must give up his job. So far steel has resisted encroachment of that form of dictatorship upon its employees.

Mr. Murray argues that steel recognizes it among some of its employees. The steel industry does recognize closed and union shops among some of its employees such as miners and railroad workers. These groups belong to unions that are not an integral part of steel. Steel people had little to say about the miners or railroads. They are the tail on the dog in both these cases.

Arguments for a union shop in steel have come from Mr. Murray and union officers. There must be thousands of rank and file workers who in their hearts reject the proposition that they must be union members in order to get or keep a job.

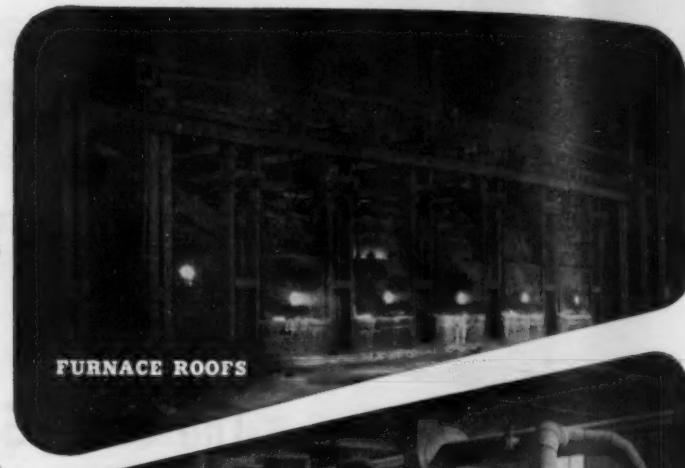
The steel union harps on the idea that a union shop is necessary for union security. That is so much eyewash. No one in steel management would dare, nor do they have any intention or desire to try to break the union. Any means that would give added security to the union is free for the asking—but not the union shop.

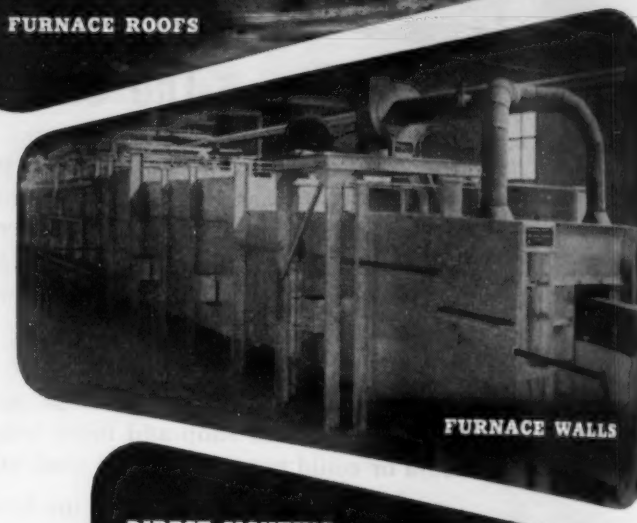
The 15 million or so union workers in this country get what they get at the expense of the 45 million who do not belong to a union. The economic power which the union now has is all out of proportion to its numbers and its responsibilities. To accept the union shop in steel would be another step along the road to complete union domination of management's functions.

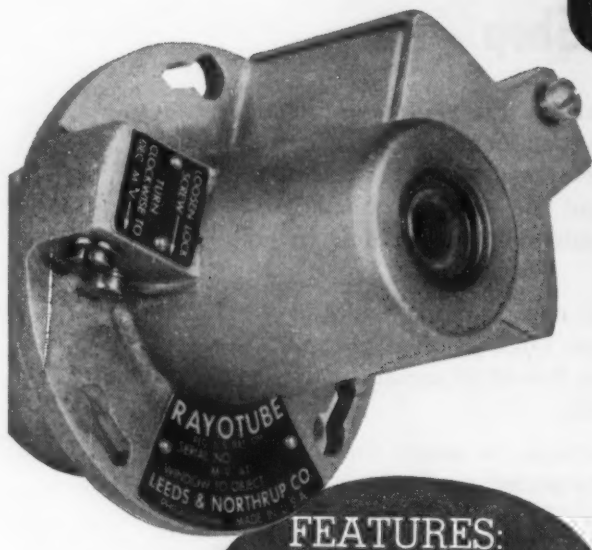
Tom Campbell

Editor

This RAYOTUBE suits all locations COOL OR HOT







FEATURES:
Quick installation
" sighting
" response to temperature

Here is the radiation-sensing unit for 9 out of every ten radiation-pyrometer uses. It adds the storekeeping advantages of smaller instrument inventory to the operating advantages* of all Rayotubes. Many hundreds of this type are now in use. Among its features:

1. Easy to install because it needs no water-jacket unless the head housing itself (shown above) reaches interior temperature of 350 F. Even then, no harm is done below 450; accuracy decreases above 350, but returns fully as temperature drops. In practical operation, even 350 is reached on very, very few installations.

When replacing a present jacketed Rayotube with this type, it is not necessary to tear out the jacket and piping. Simply insert Rayotube in jacket and turn off water if no longer needed.

2. New, quick-sighting optical system shows exact area from which temperature is being recorded. This is especially helpful when instrument is being positioned to point down an open-end tube and measure directly the surface temperature of parts being heated.

3. Can be used with Speedomax electronic instruments as well as with Micromax equipment—which blanket every temperature-recording and/or controlling job in industry.

This Rayotube is No. 8890. Any L&N office, or headquarters at 4956 Stenton Ave., Phila. 44, Pa., will send details on request.

LEEDS & NORTHRUP
MEASURING INSTRUMENTS · AUTOMATIC CONTROLS · TELEMETERS
HEAT-TREATING FURNACES

Jrl. Ad NSJ(3)

*Any L&N man can give details

Dear Editor:

Letters from readers

To The Point

Sir:

You have been doing a swell job in regard to the steel situation.

The editorial "Are You A Second-Hand American?" hits right to the point . . .

W. S. LECKENBY
President

Leckenby Structural Steel Co.
Seattle

Not Worrisome

Sir:

The story "Gears: Order Index Strips Teeth" in your June 12 issue was an accurate representation of conditions in the gear manufacturing industry. Order books are not getting any fatter, it is true, but to maintain a high level as during last year would be too much to expect.

As your story relates the downhill trend of new orders may continue into June. I'm glad that it points out that this is due to a stretch out of military production timetables.

I'm sure that gear makers are grateful for your type of coverage of our convention. It did not seek inaccurate sensationalism.

NAME WITHHELD

Cleveland

They Like It

Sir:

As a regular subscriber to your publication, we find many of your articles of extreme interest and worthy of retention. However, through an oversight we have misplaced our copy of "Here Is How A Small Plant Forges 81 MM Mortar Shells" by Charles Barrenbrugge. This article appeared in your Oct. 16, 1941 issue.

May we please have a copy of this article.

H. A. KETCHUM
Controller

Fasco Industries, Inc.
Rochester, N. Y.

Turkish Translation

Sir:

I had my engineering education in the U.S.A. from 1944 to 1950. Upon my return to Turkey I started working with the Establishment of Mechanical and Chemical Industries. We are subscribers to THE IRON AGE and study it regularly.

I now have a copy of your book "The Iron Age Production Manual." In order to help the engineering in Turkey by showing what is done in the United States, I want to translate this book into Turkish.

I would like to have your written permission to translate this book.

M. KULUR

Makina ve Kimya Endustrisi Kurumu
Ankara, Turkey

Useful Chart

Sir:

We understand you have printed additional copies of "The Iron Age Chart of Comparable Arcwelding Electrodes." We are in the business of selling welding electrodes and have many customers asking us to get them a copy of this chart.

We would like your permission to photo-offset this chart.

R. C. FESSLER

R. C. Fessler & Co.
Alhambra, Calif.

A few copies of this chart are still available at 25¢ per copy.—Ed.

Zinc Coating

Sir:

We have read with interest the article "Zinc Protects Trailer Parts From Corrosion," in your May 29 issue, describing the advantages of a material known as Zincilate 300.

We would appreciate knowing where this material can be purchased.

A. E. SAVAGE
Equipment Engineer

Capital Transit Co.
Washington

Zincilate 300 can be purchased from the Industrial Metal Finishing Co., 401 Homestead Ave., Dayton, Ohio.—Ed.

Floating Worm Gears

Sir:

We have noticed your Newsfront item of May 29 referring to a new line of floating worm gear motors which permits direct application of power to roller conveyers of rolling mills.

Won't you be kind enough to send additional information to us on this item.

G. GREENBERGER

Sage Equipment Co.
Buffalo

Further information may be obtained from Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, Ohio.—Ed.

Request

Sir:

We have a request from our chief methods engineer for three reprints of the article "Another Electro-Machining Method Shows Promise" which appeared on p. 88 of your May 29 issue.

R. A. McCLENEGHAN
Advertising Manager

Barber-Colman Co.
Rockford, Ill.

New di-acro POWERSHEAR

OFFERS
CONTINUOUS ACTION
plus
VARIABLE SPEED

From 30 to 200 strokes per minute

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The new Di-Acro POWERSHEAR has remarkable speed and accuracy for the production of small parts and pieces. Consider these points:

1. CONTINUOUS SHEARING ACTION—no clutch to engage! Feeding speed determines shearing speed. 2. VARIABLE SPEED—cutting cycle quickly set for each shearing operation. 3. EASE OF OPERATION—fatigue is reduced, accuracy increases, production soars. 4. "SINGLE STROKE" SHEARING—non-repeating safety clutch for jobs not adaptable to continuous shearing.

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giving full details on Di-Acro Powershears, also Di-Acro Benders, Brakes, Rod Parters, Rollers, Notchers and Punches.

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Please send 40-page catalog including "Die-Less Duplicating" Engineering Service Offer.

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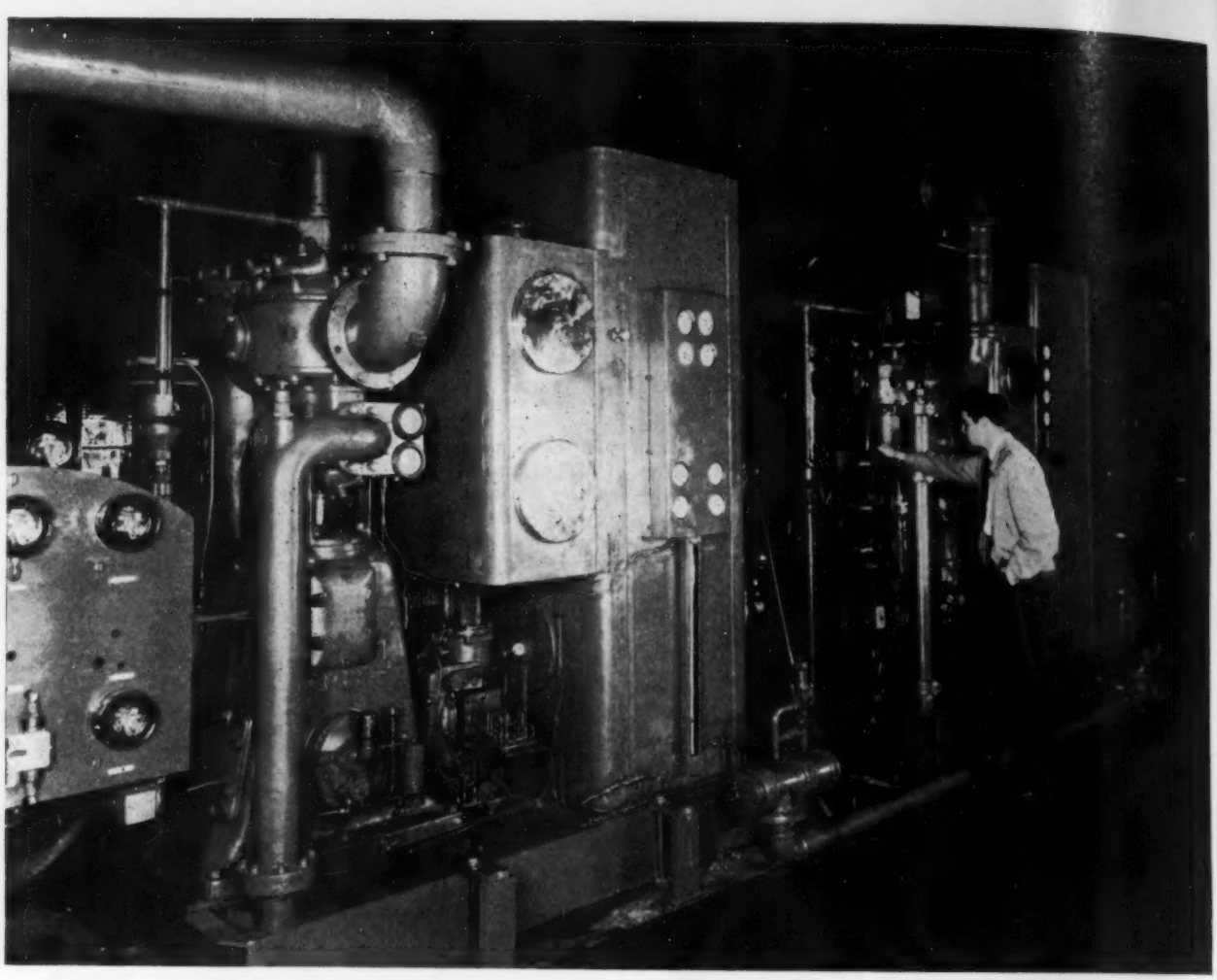

You don't buy compressed air in bottles...

WHY BUY YOUR OXYGEN THAT WAY?

Make YOUR OWN... Save up to 50%!

You don't need to depend upon rented equipment or outside sources for your oxygen supply now. Buy your own Joy "OX" unit and pocket the savings—*running as high as 50%.*

In one way or another, Joy Oxygen Generators obsolete all other oxygen supply methods. Each size unit is compact, space-saving and completely automatic . . . producing high-purity (99.5 + %) oxygen practically unattended, and easily cared for by your regular air-compressor or power-plant personnel. It's clean, too; no messy chemicals to handle and no residues to remove—the only raw material used is AIR.

What's more, Joy Oxygen Generators are inherently safe, operating at the relatively low pressure of 185 psi maximum, with the further insurance of pop safety valves and an automatic shut-off system. • The complete line includes units with capacities ranging from 500 to 12,000 cu. ft. per hour. For the *modern* way to oxygen-supply, write us your requirements. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.***

JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

WAD 5 4219

Fatigue Cracks

by Charles T. Post

On Schedule

Nothing makes the editors of your f.f.j. more crestfallen than discovering a delay in getting the weekly issues to the reader.

Here is the time table:

Just before the news deadline Tuesday afternoon, you'll hear the teletype in the New York office click-clacking impatiently. Market reports from any of the districts are accepted right up to the last minute. The New York editors evaluate them as they come in, provide vital background and interpretation. Edited material goes by messenger or teletype to the Chilton Company's Philadelphia printing plant where it is put into type immediately. Tuesday night, the presses roll. By early Wednesday morning, the first complete copies are being put into the mail sacks. Each sack is labeled for its d i r e c t destination—sometimes a city, sometimes a postal zone, in a few cases, a single building.

The sacks are delivered straight to the train on which they travel, by-passing the main Philadelphia post office entirely. From this point on, the speed with which you get your copy depends principally on your local post office.

One upstate New York subscriber was so anxious to get his issues that he decided it would be worth $28.08 extra postage annually to have them sent by first-class, or letter, mail. Two weeks after the experiment started, he reported the issues were arriving later rather than earlier. Reason: Instead of being delivered directly to the train, they had to go to the main post office to be sorted with the letters. That delay more than overbalanced the priority in delivery of first class mail.

Time Tables

If railroad time tables are confusing to you, you'll have double respect for Alfred H. Black, your f.f.j.'s manager of mail traffic. His job is to be familiar with every train in the country that carries a mail car and, with the cooperation of the postal authorities, see that the weekly issues travel the routes and make the connections that will get them to their destinations in the shortest possible time. A former high ranking veteran of the post office department, himself, he reflects a fierce pride in shaving a few minutes off the lay-over time at a distant junction point or gaining an hour by rerouting copies for an entire section of the country.

Once in a great while (such as happened last week) a group of copies will miss the train. Then there's sorrow all along the line to Milwaukee, Cincinnati, or Cleveland, and Black's mood is black, indeed.

Puzzlers

The answer to last week's puzzler would look like this:

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          80809
        ---------
124 | 10020316
        992
        ----
        1003
         992
        ----
         1116
         1116
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We have already received answers to this one from H. K. Moore, Eaton & Howard, Inc., and D. W. Sampson, McGill Commodity Service, Inc.

C. B. Smith, Portland Copper & Tank Wks. bases his answer to the homogenous bar problem on what he calls the magical figure 9. The four weights are 9^0, $9^{1/5}$, 9^1, $9^{1/5}$. This can be carried on ad infinitum but if you should stop at 12 weights you would be able to obtain weights from 1 lb to 265,720 lbs. If this idea should get around it might cause trouble for the scale manufacturers.

Others answering this puzzle are S. Grubman, State Metals & Steel Co.; L. Cooper, American Steel Suppliers, Inc.; R. W. Huff, Canton, Ohio; R. W. Shank, International Harvester Co.; H. K. Fried, British American & Eastern Co.; C. E. Norton, Chicago and G. E. Rocheleau, Kaiser-Frazer Corp.

R. W. Huff and L. Cooper also proved that there was no definite answer to the concentric circle puzzle and R. Morris and H. Reed, Linde Air Products Co. have solved the tree problem of several weeks ago.

J. F. Moloney, Agencias Generales, S. A. Mexico, thinks this one should interest you.

There are two horses exactly six miles apart who start walking towards each other at the rate of 1½ miles per hour. At the same time a bee starts flying from the nose of one horse to the nose of the other horse. Upon touching it, and without losing even the fraction of a second, he starts back until he touches the other horse's nose and returns again. The bee flies at the rate of 10 miles per hour. How far does the bee fly until the two horses' noses touch?

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The Iron Age
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THE IRON AGE Newsfront

► Use of a Houdry oxidizing catalyst to eliminate the exhaust hazard on gasoline powered industrial trucks has widened the market for this type of truck; there are now over a thousand installations. It is expected that the units will soon be put on railroad diesel locomotives. This will permit their use in covered stations where they must now be switched for an electric engine.

► Those trying to obtain steel by making conversion arrangements will have to move fast; the oil people are already in on the ground floor. They never dropped this auxiliary steel source and their 80,000-well program has intensified their efforts. One bottleneck in oil well conversion is tube round capacity.

► Use of carbon dioxide as a coolant in grinding carbide tools is growing. One big user has entirely eliminated use of diamond wheels for grinding carbides. A large tank plant and an Air Force contractor are now installing carbon dioxide systems in their tool rooms.

► A new wrinkle in steel processing is insertion of a two-high temper mill in a pickling line. Location of the unit can not be disclosed now, but it will probably be in operation early next year.

► Army Ordnance will soon receive results of an SAE survey on use of critical materials in 17 types of combat vehicles. Details of the survey will not be made public but it is expected to include recommendations that could result in extensive conservation of scarce materials.

► White brass coatings covered with chrome plating serve well as substitutes for bright nickel plate for interior use. But corrosion resistance of the new coating is not equal to that of bright nickel.

► Japanese manufacturers are trying to buy up or buy into Western copper mines and primary processing facilities. Cheap trans-Pacific water rates and low labor costs give them an economic edge. The Japanese government is also trying to exchange machinery for copper ore from Chile.

► Plasticizers are gaining recognition as specialty lubricants. The reason: Their viscosities show relatively small changes under temperature extremes. Plasticizers are already being used as lubricants in jet aircraft engines.

► An electrically conductive plastic material applied to metal parts will heat up to 400°F. This film heats through resistance, can be applied as a tape or sprayed on.

► Reverse cleaning—still under development—is one of the most promising fields in metal finishing. Variable conditions under which the process is applied make it difficult to get consistent results now. However, some installations are working satisfactorily.

► Cast iron slugs have been successfully hot extruded into hollow sections. While there is no application in mind at present, the experiment proves that a brittle non-malleable metal can be extruded.

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MINERALS: Better Get Smart or Go Broke

Running mate to heavier industry is sapping of natural resources . . . Higher costs for raw materials means undermining standards of living . . . Looking ahead on mineral prospects.

The leechlike running mate to growing American industrialization is the gobbling up of the finest and cheapest natural resources. Unless wise action is taken, cost pressures of much greater demand while natural resources shrink will undermine our standard of living and economy by stiffer prices for raw materials.

This is the warning contained in the voluminous report of the President's Materials Policy Commission, studying since 1951 the problems of waning resources, energy, and the promise of technology. Disturbing is the Commission's conclusion that the decline in cost of raw materials (contributing to a less expensive product) has generally been slowed, halted, and even reversed.

Use Zooms — Evaluating the strain of our industrial growth on metals and minerals in the earth, the commission pointed out that in 1950 we were using three and a half times more iron ore than in 1900—three times more copper, four times more zinc, two and a half times more soft coal, 26 times more natural gas, and 30 times more crude oil.

The U. S. has but 10 pct of free world population and 8 pct of its area. Yet in 1950 this country used over 50 pct of supply of such basic materials as petroleum, rubber, iron ore, manganese, and zinc. That the trend is up is obvious. Using a conservative base, the commission forecast that the gross national product would jump from $283 billion in 1950 to about $566 billion in 1975. Meanwhile, population will rise from 151 million to 193 million.

Thus rising real costs in industry become a positive menace as we dig deeper, toil harder to extract raw materials that go nearer depletion and get leaner.

Need Unity of Resources—The commission warns that the U. S. cannot stand alone on raw materials. Because we have reached a have-not status, reliance on foreign resources will grow. Thus the U. S. and friendly nations "must coordinate their resources."

More fabrication, more services will work against consumption of raw materials to match the doubling growth of gross national product by 1975. Use of raw materials should increase by 50 to 60 pct by 1975. But demand for minerals generally, including metals, fuels, and non-metallics, will show the most precipitous rise—about 90 pct. Demand for energy will double and for water will be roughly 170 pct of what it was in 1950.

Projecting demand forward for 25 years, the commission estimated the nation would use 54 pct more iron ore, 43 pct more copper, 39 pct more zinc, 18 pct more tin, 291 pct more aluminum, and 18 to 20 times more magnesium. This totals to grief in resources.

What can scale these estimates down is substitution of other elements. For instance, discovery of a cheap process to recover the metal titanium can result in its much wider application, replacing other metals. What can balloon the commission's forecast is finding new uses for raw materials.

On the basis of a doubling of the gross national product, consumption of electricity must increase about 260 pct, demand for

U. S. MATERIALS CONSUMPTION 1950, AND PROJECTED TO 1975

Material	Unit	1950 Total	Projected to 1975 Total	Projected Pct Increase Total Demand
Copper	Thousand short tons	1,730	2,500	45
Lead	Thousand short tons	1,212	1,950	61
Zinc	Thousand short tons	1,156	1,600	38
Tin	Thousand long tons	93	118	27
Antimony	Thousand short tons	37.4	66	76
Aluminum	Thousand short tons	983	4,500	358
Finished Steel	Million short tons	68	110	62
Crude Steel Products	Million short tons	96.8	150	55
Iron Castings	Million short tons	13.5	22	62
Pig Iron	Million short tons	65	100	54
Iron Ore (50%)	Million short tons	130	200	54
Nickel	Thousand short tons	100	200	100
Chromite	Thousand long tons	875	1,750	100
Molybdenum	Million pounds	36	70	170
Cobalt	Million pounds	9	40	340
Tungsten	Million pounds	6	15	150
Manganese Ore (46%)	Thousand short tons	1,800	2,700	50
Fluorspar (100%)	Thousand short tons	369	1,060	187
Rubber	Thousand long tons	1,620	3,300	104
Sulfur	Thousand long tons	4,806	10,100	110
Petroleum	Million barrels	2,375	5,000	110
Coal	Million short tons	522	815	56
Natural Gas	Billion cu ft	6,300	15,000	138
Electric Energy	Billion kw-hr	389	1,400	260

liquid fuels may double, for natural gas, triple, and for coal, increase 60 pct. (All these estimates could be altered by war's more voracious demands on industry.)

Oil shales, becoming an economic possibility, can add hugely to oil reserves. Atomic energy potential as a power source is still vague and should not be relied on to exert any influence by 1975. However, coal can be counted on to become more important as other fuel resources wear out.

The supply of hydropower may decline proportionately as demand rises and some industries having vital need of cheap power (such as aluminum) may have to turn increasingly to lower grade lignites.

Have-Not Nation — In the 1940's America made a transition from a nation owning a surplus of raw materials to a deficit nation. National defense is putting us deeper into import debt. For 74 categories of strategic and critical materials listed by the Munitions Board, all raw materials must be imported for 40 and part for the rest.

The transition to have-not status for the U. S. is further marked by the fact that out of 100 mineral materials industry uses, only a third are in total domestic supply. Another third comes both from home and imports. The balance comes here strictly through imports. In the latter category are some of the alloys gaining increasing use because of higher demand for heat resistant steels and metals for electronics devices.

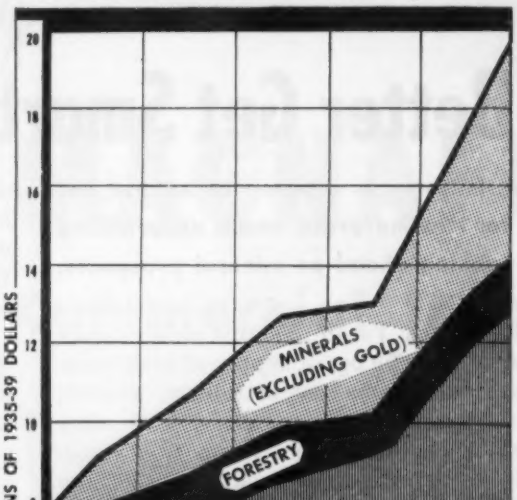
The commission points out that its report is not intended to drive the nation headlong into hysteria but to motivate corrective actions. The prime remedy for our ailing natural resources is "flexibility." This involves broadening our usable resource base, finding new sources of supply, and substituting for freer raw materials.

Use May Change—Conservation must play a greater role in the future. It must be remembered that the task is to continue and enlarge America's productive machine. This entails not cutting down use but promoting wisdom of use. "Effective conservation calls for the efficient development and use of resources as against uneconomic squandering or sterile hoarding." A point to consider to discourage hoarding of resource is that a progressing technology sometimes changes consumption of raw materials completely.

An optimistic chime sounds in the report. Under the earth's crust are ores of the same type found exposed on the surface. Successfully used for oil exploration, airborne electromagnetic instruments are doing the same searching for ores. More efficient extraction permitting economic utilization of poorer ores is on the way.

Change in buying tastes can effect savings. Reclaiming "scrap" materials will become more of a science. For instance, we throw away 2 million tons of scrap steel and 12,000 tons of tin by not reclaiming the tin can.

Rate of Materials Consumption



Source PMPC Staff

Research on Resources—Technology, proven brilliant in dealing with need for new products, must turn its weight toward attacking the materials problem as a whole. Research must broaden to consider natural resources. More than half the research bill of $2.9 billion in 1952 went for the development of military devices. There is a pitiful amount of research going into sustaining and increasing natural resources.

Assuming a 50 to 60 pct increase in use of raw materials by 1975, total materials consumption will leap from the current 2.7 billion tons a year to 4 billion in the same 25 years. Greater imports seem inevitable —possibly amounting up to a quarter (by value) of what's consumed. Saving feature here is flexibility of raising domestic output or by developing substitutes.

All in all, it will benefit the United States to import, especially from relatively underdeveloped nations where our own money will furnish the basis for a growing market for our finished goods.

Recommendations—The commission argues for integration of various national economies of the free world, greater investment of U. S. capital to develop overseas resources, lessening of tariffs, consideration of the principle that America must buy its raw materials at the least cost despite desire for more expensive self-sufficiency.

The commission urges complementary fact-gathering programs developed by industry and government in the fields of reserves, costs, technology, and use patterns. There should be, the report adds, a complete census of mineral industries, as authorized by law; an accelerated campaign of topographic and geologic mapping; and an intensive drive to improve techniques of and instruments for exploration.

STEEL: Famine Hits Defense Plants

Defense cutbacks are mounting . . . Mortars, tanks, bazookas, shells, trucks included in growing list of retrenchments . . . Long lead time may leave production gaps—*By E. C. Beaudet.*

Time is starting to work against steel consumers. Reports of cutbacks in production schedules were mounting as the major part of the steel industry entered its fourth strike-bound week. Daily steel production losses are put at more than 250,000 tons.

While overall inventories at the strike's start were more ample than these reports indicate, shortages of certain critical items such as bars, seamless tubing and heavy plates are causing some manufacturers to slow up schedules in hope of stretching inventories until the strike is settled and shipments resume. Hardest hit were military products. Effect of releasing finished steel from mills and warehouses had not been felt at press time.

Defense Output Crippled—Meanwhile, companies were scouring all sources in attempts to plug up or forestall gaps in their production lines. Warehouse buying was stepped up and conversion arrangements on the upturn.

In the Ohio area, production of mortar shells at the Bedford plant of Lempco Products, Inc., was one of the first military items to suffer.

As of last week, 300 out of 500 employees had been laid off and one of the two Lempco shell lines was down completely. One thousand tons of steel released by The Rheem Co. will permit Lempco to operate for another month.

Other Firms Hit—Another key shell producer is also being hurt. The Liberty plant of Mullins Mfg. Co., in Warren, Ohio, has scheduled a 3-day week starting June 23 in order to stretch out supplies of extremely tight bar stock for production of 81 and 105 mm shells. The firm's Salem, Ohio, plant, making Navy ordnance items, was also slated for 3-day-week operations. This move will cut Mullins shell production in half but stretch steel supplies through July.

Production of electrodes at Lincoln Electric's plant in Cleveland was expected to taper off this week with the plant being almost entirely out of steel when it closes for vacation July 11.

On heavier ordnance items, the Cadillac tank plant in Cleveland is expected to operate only until the end of June at full production, before slowdowns start. One of the most critical items endangering output is alloy forging stock.

Willys in Toledo intended to start laying off workers at its main plant, its Pontiac foundry and the jet engine component plant at Anderson, Ind., some time this week.

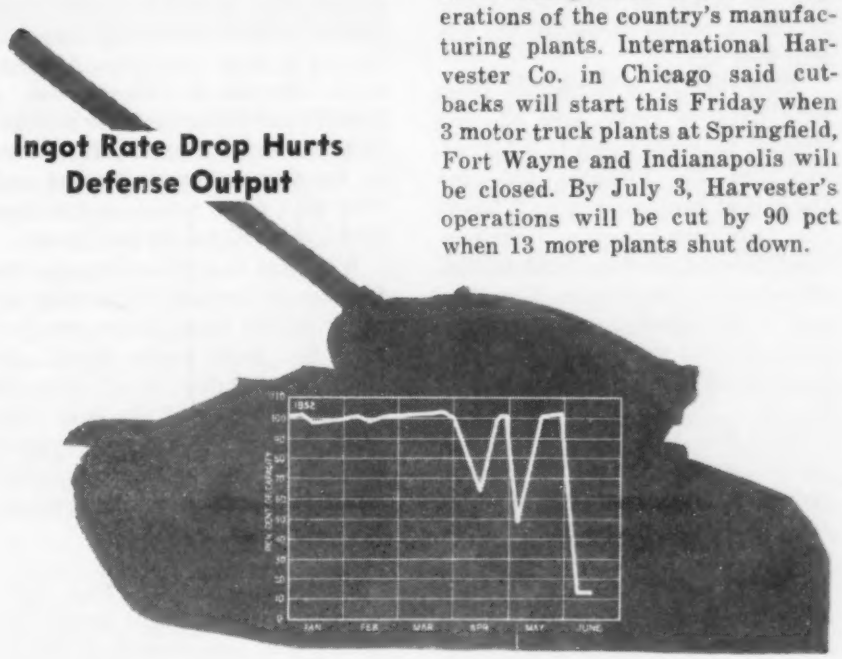
Time Lag Feared — While a quick resumption of steel operations could put off many anticipated cutbacks, steel users, already having troubles, were fearful of being nipped by the time lag between renewal of steel operations and shipments. In the motor capital, Detroit was concerned with the disruption of supplies that would cause shortages later.

Ford Motor Co. last week made immediate plans for reducing operations at the Rouge and fifteen other assembly plants to 4 days a week, then reversed itself shortly thereafter. Reason was to maintain production quotas in subsequent quarters.

More Cutbacks—Military items in the area seemed in serious difficulty. Army ordnance officials claimed production of tanks at the Detroit arsenal would be cut by 30 pct during July due to a dwindling supply of cast armor turrets with a complete stoppage forecast by Aug. 1. A shortage of Army truck wheels was slated to halt output of Dodge military trucks by June 25, thus idling about 4500 employees. Both Ford and Oldsmobile Div. of General Motors said shortages of seamless tubing would scuttle output of 3.5 in. Army bazooka rockets this week. GM's Chevrolet Shell Div. in St. Louis will be forced to shut off 105 mm shell output next week.

Harvester, Too—In other areas, the strike of steel workers was also making inroads into the operations of the country's manufacturing plants. International Harvester Co. in Chicago said cutbacks will start this Friday when 3 motor truck plants at Springfield, Fort Wayne and Indianapolis will be closed. By July 3, Harvester's operations will be cut by 90 pct when 13 more plants shut down.

Ingot Rate Drop Hurts Defense Output



STRIKE: Gary Takes a Sleeping Pill

U. S. Steel's Gary works becomes a ghost plant . . . Blast furnaces are banked and openhearths shut down completely . . . Skeleton crew remains on the job—*By K. M. Bennett.*

Last week the world's largest steel mill sweltered in Chicago's heat. It was strike-bound.

U. S. Steel's far-spread Gary works is capable of producing almost 6 million tons of coke annually, more than 4.5 million tons of pig iron, and 6 million tons of steel.

A mill of this size needs huge quantities of coke, and the mill's 1148 coke ovens, arranged in 16 batteries, are vital. Like the blast furnaces, a drop in temperature in the coke ovens could shatter their lining, so the ovens are in operation although at a very low rate. Keeping the 16 batteries at about 1100°F, supervisory personnel push 80 ovens per day, hitting each oven for recharging about every 15 days.

Coddle Blast Furnaces—The most delicate handling is reserved for the blast furnaces. Gary works normally operates 12 furnaces of which seven have 28-ft hearths or larger. One of these hefty prima donnas has been pulled out for repair. The lining gave way. The furnace had been in poor shape, and the strain of three shutdowns in a short period completed the job, mill men say.

Each furnace is rodded on alternate days to make sure banking charges have not fallen to a dangerous level. The furnaces, following the initial banking charge 2 weeks ago, have been put on a "light burden," a blast furnace pablum that gives body to the charge. Unmelted ore is not allowed to accumulate since internal temperatures are not high enough at present to liquefy the ore.

Since the strike began, the typical furnace has burned 2.5 charges, each running about four skips of coke, two of ore, and one of limestone.

Under Wraps—Putting a blast furnace under wraps is not simple. The typical furnace in the 28-ft class began its shutdown with a sleeping potion of roughly 270 tons of coke.

This was followed by a "light burden." The light burden ran in 23 charges, aggregating 270 tons each of coke and ore and a considerably smaller amount of limestone. The whole load was then topped off with an ore blanket containing a small admixture of limestone. Banked in this manner, a furnace can retain heat for months. Danger lies in temperature change as the furnace is reactivated and then shut down again, as has happened three times in past weeks.

With this load in her innards, the furnace is checked continually for water or air leaks, since the furnace has been made almost air tight by stopping of all openings and the painting of the bosh with a gummy tar. Shutdown required about 26 hr. To get these furnaces into full operation again, however, will take 1 to 2 weeks.

No Reconstruction—The openhearths have been shut down completely, and here trouble is beginning to appear. Gary works has 51 basic openhearths, along with about seven other steelmaking furnaces of differing design. Roofs have begun to collapse in the basic furnaces. Mill men indicate that no reconstruction of the damaged furnaces will be attempted during the strike.

But Gary remains a ghost plant. Where 15 blast furnace men and their help occupied an office, one man sits alone at the telephone. There is no movement in the plant other than when supervisory personnel prepare a charge for one of the blast furnaces.

Waiting for Sandwiches—Outside the gates, a handful of pickets are playing catch. Just beyond a few more sit in their parked cars waiting for sandwich deliveries from union headquarters. Downtown Gary is apprehensive about strike effects, but businessmen report no great falling off in business. The stores are well filled. But union headquarters is surrounded by idle mill hands with nowhere in particular to go. Many are dissatisfied with the strike.

Meanwhile, 758 supervisors and foremen, all that remain of a 22,000 man workforce, tend the banked, unproductive fires of the world's largest steel plant.

Who Wants The Union Shop?

A poll conducted by the Beaver Valley, Pa., *Times* indicated an overwhelming sentiment by steelworkers to accept the steel industry's last offer of 24.6¢ per hr in wage and fringe benefits without the union shop.

Of 717 ballots received as of last Monday, 630 were in favor of accepting the industry offer and returning to work, while 87 were opposed. Affirmative votes were 87.9 pct of the total.

All those voting were steelworkers. There was no requirement to sign the ballots.

Single Action on WSB Petitions

Employers may file petitions with Wage Stabilization Board by unilateral action in "exceptional" cases where two or more unions represent employees and where issues concerned have never been the subject of management-labor collective bargaining.

WSB, which authorized this action by Resolution 98 on June 10, said it will ease the handling of about 100 pending cases filed by employers. Many of these cases relate to adjustments in health and welfare and pension plans.

Res. 98 provides that, prior to filing by single action, an employer must inform the unions of his intention, giving each an opportunity to state possible objections.

STEEL: Union Tries Split and Conquer

Negotiators meet secretly in New York . . . Bargaining flounders quickly on union shop . . . Union seeking soft spot, hoping to sign one company to break resistance—*By J. B. Delaney.*

Early this week neither side appeared ready to cave in on the one issue holding up a steel settlement —the union shop. A glimmer of hope arose last Friday when it was learned that top negotiators of union and industry unexpectedly gathered in New York. But this effort foundered quickly on the union shop rock.

Union strategy still seems to be that of divide-and-conquer. Its only hope of victory apparently lies in persuading one of the large producers to sign up. It used these tactics successfully in 1949 when Bethlehem Steel Corp. broke the solid front against pensions and other producers were forced to fall into line.

These companies have signed WSB-type agreements with the union: Kaiser, Barium, Pacific States Steel Co., Judson Steel Corp., Standard Steel Spring Co., Pittsburgh Screw & Bolt Co., Universal-Cyclops Steel Co., and Detroit Steel Corp.

Production Hope — The Taft-Hartley Act appeared this week to offer the only hope of an early resumption of steel production.

There was some doubt that even this would be immediately effective. In a speech at Gary, Ind., last Sunday, President Philip Murray of the United Steel Workers of America (CIO), hinted the union might resist an anti-strike injunction should President Truman invoke the law.

President Truman has been reluctant to use the law, and held off even after a request by the Senate.

A similar request by the House was expected to force the President to act.

STRATEGY: Senators Everett M. Dirksen (R., Ill.), Robert A. Taft (R., Ohio), and John M. Butler (R., Md.), map their opposition to Sen. Burnett Maybank's (D., S. C.) proposed labor law granting authority for presidential seizure of critical industries.

Hurting Defense—A resumption of production would be a welcome development from the standpoint of the defense effort and the national economy. The current strike, coupled with shutdowns in April, by this weekend will have cost approximately 9.5 million ingot tons. Some defense plants are beginning to feel the pinch now (see page 57). Lack of steel already has idled thousands of workers.

Going Slowly—The union apparently intends to drag its feet on the proposal to reopen selected plants to produce defense steel.

Some steel executives who contacted the union on the proposal got the impression they would be expected to sign a contract based on the Wage Stabilization Board recommendations before the men would return to work.

The proposal presents problems for both sides. Partial operation of a steel plant would be difficult.

Companies that reportedly would reopen for defense production include Pittsburgh Steel Co. at Monessen and Allenport, Bethlehem Steel at Lackawanna, Republic at Chicago, Babcock & Wilcox at Beaver Falls, Lukens at Coatesville, Newport Steel at Newport, and three plants of Crucible Steel Co.

Will Move Steel—The one bright spot in the picture was willingness of the union to move finished steel for defense end uses from struck mills and warehouses. Movement was expected to start this week.

The union issued specific instructions to local unions on the type of steel to be moved. Only finished steel bearing A to E, Z-2, and the B-5 suffix ratings will be shipped. This covers material for military and atomic energy purposes, for metalworking machinery and equipment, and component parts for defense.

Strike Halts Jet Engine Output

Already lagging jet engine production has been dealt a severe blow last Thursday by a strike of American Federation of Labor machinists which has closed General Electric Co.'s Lockland, Ohio, plant.

About 10,000 employees stayed away from their jobs because of picket lines of the 900 striking machinists. They are demanding a union shop, wage increase and elimination of the present work classification system.

PIG IRON: Supply Slowly Melts

Availability about 30 pct of normal during strike . . . Stocks average 2 to 4 weeks . . . Foundry sales drop seen—*By E. C. Beaudet.*

IN DOUBT: "When would blast furnaces be producing again?" was the $64 question for foundrymen as the steel strike went into its fourth week.

As shutdowns or production cutbacks due to lack of steel were becoming more widespread last week, few foundrymen as yet were echoing "me too" sentiments as far as supplies of pig iron were concerned. Overall there were virtually no signs of any foundries being forced to shut down or cut schedules due to lack of pig iron. Government sources report the industry as a whole went into the strike with about a month's supply on hand. A check of foundries 2 weeks after the strike revealed inventories running anywhere from 2 weeks to a month.

One reason for the healthier outlook is that production of pig iron for foundries during the strike is proportionately greater than that of steel for steel users. While production of steel from operating mills averages about 13 pct of prestrike output, pig iron production for sale continues at about 30 pct of normal availability.

Some Saving Iron—Some fourteen companies, including integrated mills and strictly merchant iron producers, were still operating furnaces last week. Of these only about eight firms would have iron for sale in any sizeable amounts. The rest for the most part were laying down iron for themselves or their affiliated companies for use when the strike is over.

One steel company having different unions for its steelmaking and blast furnace facilities was able to offer additional pig iron for sale over its normal amounts. Another pig iron producer was able to reach an agreement to continue production even though its contract with the union ended last week.

At the beginning of the year, production of pig iron for sale was running about 630,000 net tons per month. During the strike, blast furnaces still in operation will be able to make available for sale some 180 to 200 thousand net tons. The greater part of this production will, of course, go to regular customers of these firms.

However, some pig output can be put to use for those foundries running into difficulty. One foundry requiring low phos iron for production of armor castings was helped out in this way last week when its regular source was cut off.

Not So Sick—While the situation on pig iron is healthier than that on steel, it does have grave possibilities. Although not in the majority, a good many foundries went into the strike with less than a month's inventory. They can stretch out these supplies with a greater charge of scrap and adjustments in melt analyses.

How long they will be able to make them stretch is open to question. A large number of foundries are going down for vacation during the first 2 weeks of July. Some have actually pushed vacations ahead to this date hoping shipments will resume during the vacation period. A few caught short at the time of the strike have purchased Canadian pig.

As their supply of pig iron continues to dwindle, foundries are growing more concerned over their order books. Cutbacks or shutdowns brought about by the lack of steel in manufacturing plants will necessarily result in a lower demand for castings.

Skid Further — Order books, which have been far from healthy, will take another dip. In general, foundries serving heavy industries are enjoying a higher volume.

However, prior to the strike some gray iron foundries were operating only 3 to 4 days a week. Raw materials including scrap, pig iron and coke were in good supply but orders weren't. Those foundries supplying the automotive, electrical appliance, railroad and agricultural implement fields will be hardest hit by the steel strike.

Fastener Industry Told to Grow

Government experts on requirements said last week the precision and large-size fastener industry needs to expand its productive capacity by at least $33 million before July, 1953.

This does not include replacement of worn and out-moded equipment used in turning out the fasteners needed for assembling planes, tanks, farm machinery, and so on.

AIR POLLUTION: A Goal in Sight

Unit by inventor of oil industry's "cat cracker" yields large heat savings, kills fumes . . . May mark beginning of whole new industry . . . Installed in furnace stacks—*By G. F. Sullivan.*

At first it sounded like perpetual motion, too fantastic to believe. But when you heard that world-famous scientist Eugene J. Houdry was behind it you had to look twice. The second look—or rather sniff—on the hot tar roof of Enamelstrip Corp.'s Allentown, Pa., plant convinced you that a new oxydizing catalyst marked the coming-of-age of a whole new industry.

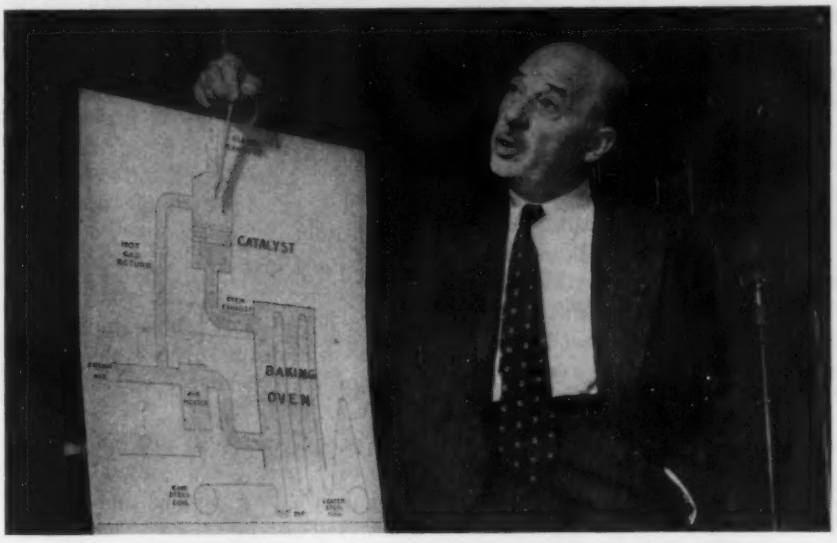
Enamelstrip's executive vice-president and general manager, Arthur E. Uhleen, had been in a bad jam. The plant had to expand. Business (coating coils of steel, aluminum and other metals for fabricators of toys, tiling, dry cells, appliances, etc.) was growing fast —from $25,000 to $2,500,000 a year in 10 years.

But the plant's stacks gave off what nearby residents called "noxious odors," actually from xylol, solvent used in the coating process. The citizens went to court for an injunction against plant growth.

Enter Mr. Houdry—Then Scientist Houdry was persuaded by Mr. Uhleen to try a catalyst Mr. Houdry had applied to a thousand industrial trucks to kill their exhaust fumes. He agreed to supply several hundred small catalytic units to be laid in the baking oven exhaust stack.

Each unit is an assembly 5½ in. long of 73 coated porcelain rods. Rods are held in two thick porcelain end plates joined by a porcelain spacer bar. Vital part of the assembly is the 0.003-in. coating of alumina and platinum alloy on the rods. Streamlined rods are set in staggered rows to insure good contact with stack gases.

With full cooperation from the Houdry staff, it took Mr. Uhleen just 6 weeks to fit his three stacks with the catalyst and to prove that all the xylol fumes were consumed by the catalytic alumina and platinum alloy. He also found that the gas bill went from about $3000 to $300 a month because the heat generated by the oxidation could be returned to the baking ovens. The $16,000 installation will pay for itself in 6 months. Heat still being wasted will be recovered by a heat exchanger for process and plant heating.



EXPLANATION: Inventor Houdry describes his catalytic cracking process.

"Slightly Overwhelmed"—B. L. Gamble, chief engineer of Ferro-Enamel Corp., Cleveland, manufacturer of the ovens at Enamelstrip, was staggered by the implications of this first plant installation of the catalytic units. "When I consider the possibilities of applying the catalyst to the synthetic finishing industry, I'm slightly overwhelmed. In fact, I can visualize an entirely new concept of paint baking."

Mr. Gamble is not alone. Others who have seen the unit or who have investigated its possibilities are equally amazed.

Savings—Throughout all industry the possibilities are tremendous. Installations are now being engineered for half a dozen other companies, including Sun Oil. Wide use of catalysts in the oil industry could save the equivalent of 7 million bbl of oil a year in petroleum products now wasted in the air, Mr. Houdry estimates.

Oxy-Catalyst Mfg. Co., Ardmore, Pa., the company which Mr. Houdry founded in 1949 with his sons Jacques and Pierre, tailors each application for the job. The catalyst must receive a certain amount of heat and the fumes must contain elements which the catalyst can oxidize. It may now be possible to deodorize leaded gas.

Since carbon monoxide is present in many industrial heating applications (power plants, blast furnaces, openhearths, etc.—even in home oil burners) the possibilities are fascinating. Many fields remain to be investigated in detail; temperatures and presence of contaminants determine the outlook in each case. But chances are much better than even that the development means an entirely new industry not only because of its ability to abolish a great deal of air pollution but also because of its tremendous potential savings in energy.

A technical article on the Enamelstrip installation will appear in an early issue of THE IRON AGE.

QUOTAS: NPA Eases Metal Curbs

Self-certification ceilings raised on copper, aluminum . . . Steel controls unchanged . . . Lighter aluminum needs, hopes for better copper stocks main reasons—*By A. K. Rannells.*

A significant decontrol step which for working purposes removes about 25,000 manufacturers from direct copper and aluminum allocation control has been taken by National Production Authority.

It is accomplished by the simple expedient of sharply boosting self-certification ceilings for the two metals.

No changes are made in steel self-certification. And the agency has also postponed its intended relaxation of limitations on structural steel until after the strike is settled.

The reason for the action is two-fold. One is that softening of aluminum demand has been indicated. It is admitted at control agencies that CMP tickets issued to non-defense users for third quarter have not been and are not being cashed in the volume that had been "forecast when their needs were stated in March."

More Copper—The second reason is that NPA and Defense Production Administration are optimistic as to future increases in copper supplies. This is expected to result not only from the new import pricing setup, but also from government-guaranteed price agreements at home and with Canada. These are estimated to produce an additional 430,000 tons between now and 1956.

It is said unofficially that this action was taken now to allow a moderate building up of copper and aluminum inventories against a time of better steel supplies.

This decontrol move followed by a day or so an earlier action by which an extra allotment of 100 million lb of copper supplies was made to manufacturers for third-quarter use.

The relaxed ceilings, together with certain qualifying restrictions, are brought about by amendment of Dir. 1 to CMP Reg. 1 and an amendment to NPA's order M-100. They are effective July 1.

Under the new rules, three separate manufacturing levels are set for the increased self-certification allowances — depending upon the size of the manufacturing plants. They are:

1. Small manufacturers may certify their own orders up to 10,000 lb of copper products and up to 20,000 lb of aluminum—regardless of base period consumption.

This group is still restricted to a ceiling of 25 tons of carbon steel and no stainless. These firms had previously been scheduled to get 500 lb of copper and 1000 lb of aluminum.

2. For medium-size manufacturers, tickets may be written for up to 20,000 lb of copper and 40,000 lb of aluminum products—or 100 pct of base period use, whichever is less.

These firms were originally held up to 3000 lb and 4000 lb, respectively, for copper and aluminum self-certification. The ceiling for steel remains at 60 tons of carbon and 16 tons of alloy with 500 lb for stainless.

3. For the largest manufacturers, the ceiling is raised to 40,000 lb of copper and 60,000 lb of aluminum—providing such certification does not exceed 75 pct of base period consumption. Steel ceilings are the same as for the second group.

Since third quarter allotments had already been issued, all manufacturers affected by the new self-certification ceiling shift may increase their purchases to the permitted ceiling without asking NPA for specific permission to do so.

This heads off the mountains of paper work which would have been involved in the flood of applications from firms wanting to take advantage of the new allowance.

Basis of this move is the fact that out of between 30,000 and 35,000 third-quarter CMP applications, only about 4000-5000 asked for more than 40,000 lb of copper. Roughly 2000 asked for more than 60,000 lb of aluminum.

On this basis, approximately 25,000 manufacturers would be able to buy practically all of the two metals needed without going to NPA for direct allocation of supplies.

"OPS will soon consider preparing to consider a proposed amendment to CPR 1121."

Industry Controls This Week

Copper—Amend., M-16 establishes separate monthly allocations of domestic refined copper to brass and wire mills, foundries, ingot makers and miscellaneous producers.

Freight Rates—SR 106, GCPR and SR 28, CPR 22 allow sellers of certain construction materials to increase ceiling prices on delivered goods by an amount equal to the increase in freight charges. SR 5, CPR 7 permits retailers to increase some prices as compensation for higher transportation costs.

Self-certification—Amends. Dir. 1, CMP Reg. 1: Rev. CMP Reg. 6 and M-100 increase self-certification of aluminum and copper for small users.

Steel—Dir. 4, CMP Reg. 3; Dir. 13, CMP Reg. 1 and Dir. 1, M-6A are made to insure the flow of available steel to defense projects and machine tool builders.

talk about MULTI-PURPOSE

this KLING is really the "jack-of-all-jobs"

KLING COMBINATION SHEAR, PUNCH AND COPER

When you were a boy, your ambition was to have one of those jack-knives with over a half-a-dozen blades that would do everything. Right now, wouldn't you like to have such an all-purpose machine in your shop?

Here it is! The Kling Combination Shear, Punch and Coper that handles all the different operations shown above and many more. One of these Kling Machines in your shop can turn out the work of a separate punch, angle shear, bar shear, plate shear or notcher — and yet it costs only a few dollars more than a single-purpose punch.

For increased speed and safety, each end operates independently. Foot pedals allow both operators to keep hands free to hold work.

On all kinds of metal-fabricating jobs this Kling Combination will speed up your production, save man-hours and make money for you. Available in 3 sizes for light, medium or heavy work; all ruggedly built, and all meeting machine tool precision standards.

SEND FOR FREE BULLETIN that gives you complete details of all the jobs this machine can do; full technical data and specifications. Ask for Bulletin 347. Kling Bros. Engineering Works. 1322 North Kostner Avenue, Chicago 51, Illinois.

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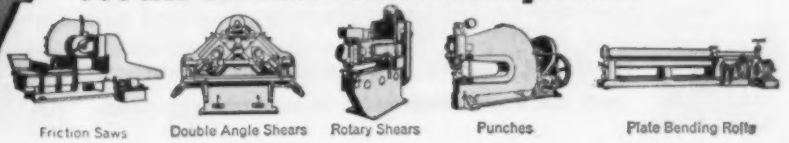

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AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: HOW TO MAKE PAINT STICK TO GALVANIZED IRON WITH LITHOFORM®

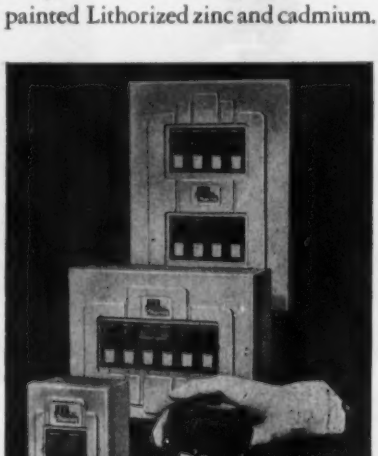
INTRODUCTION

"Lithoform" forms a dense, zinc phosphate coating on zinc, cadmium, and galvanized surfaces—including Galvanneal, cadmium plated steel, zinc plated steel; zinc base alloys, and zinc base die castings. The "Lithoform" coating, which is non-metallic and inactive, retards reaction between alkaline metal oxide and the paint film. Peeling and loss of adhesion are thus greatly retarded on painted Lithorized zinc and cadmium.

ADVANTAGES OF "LITHOFORM"

"Lithoform" forms a durable bond for paint. It is economical. It eliminates frequent repainting. It protects both the paint finish and the metal underneath. "Lithoform" meets these Government Finish Specifications:

QQ-P-416
RR-C-82
MIL-E-917A (Ships)
JAN-F-495
AN-F-20
U.S.N. Appendix 6



Photograph by courtesy of Murray Manufacturing Corp.

Murray Circuit Protectors are fully magnetic and provide maximum protection for both domestic and industrial wiring. Housings are of galvanized iron which is Spray Lithorized for long paint life.

THE LITHORIZING PROCESS

"Lithoform" can be applied by brushing or spraying the work with simple hand equipment, by dipping it in tanks, or by spraying it in industrial power washers.

Brush. Galvanized bay windows, cornices, rain gutters, hardware, building siding, truck panels, and farm equipment are typical of the many surfaces that are treated effectively with Brush "Lithoform".

Dip. This grade is used for coating cleaned surfaces of such typical products as cabinets, refrigeration condensers, etc., immersed in heated solutions in tanks.

Spray. The spray process is the most logical one with which to coat sheets, coiled strip or duplicate products best processed on a conveyor.

CHEMICALS ACP PROCESSES WRITE FOR FURTHER INFORMATION ON "LITHOFORM" AND ON YOUR OWN METAL PROTECTION PROBLEMS. CHEMICALS ACP PROCESSES

—Controls—

Prices:

OPS permits slight hike in some prices to offset hauling rates.

Sellers may list slight price increases on some items, the Office of Price Stabilization says in a new order authorizing pass-through of higher freight and parcel post rates to buyers of more than 1000 consumer items. Effective date of the regulation was June 23.

OPS points out that most of the merchandise affected has been selling below permitted ceilings. Covered by the order are radio and television sets, furniture, clothing, shoes, gardening tools, toys and games, and a number of home appliances, not including refrigerators, washing machines, stoves.

Reason for Supplementary Reg. 5 to Ceiling Price Reg. 7 lies in advances in transportation rates. Since May, 1951, according to OPS, these rates have gone up from 6 to 25 pct, and "much more" in some cases. Less-than-carload charges on furniture are said to have climbed by 35 to 130 pct in some zones.

SR 5 gives the retailer two methods of adjusting ceiling prices. The first of two ways to adjust prices requires deducting base-period transportation costs from current carrying costs, adding the difference to existing ceilings. A variation involves use of a factor applied to current transportation costs.

Using a second procedure, the retailer may multiply the percentage ratio of total transportation costs to total purchases in a base year by the applicable increase factor. The resulting figure is added to the net cost of an article.

Ease Mine Priorities

Changes in regulations which are intended to broaden priorities assistance to the mining industry are being put into effect.

These changes, provided in recent revision of DMPA's MO-7 and NPA's M-78 provide:

Minor capital additions which may be made with self-endorsed ratings is increased from the prior

$2000 to $5000 per item, to a total of 20 pct of the producer's established quota for MRO supplies, and special emergency or disaster assistance.

The new regulations apply to all serialized mine, mill and smelter operators, both domestic and foreign, who have registered with Defense Materials Procurement Agency and have been assigned a serial number.

Tin Quotas to be Extended

Continuation of the 90 pct quotas for over-all tin usage is apparently in the cards for the immediate future—in spite of the currently better supply outlook.

Reason is that control authorities themselves are not sure how long present supply levels will continue. National Production Authority says that this uncertain future makes it necesary to continue present "conservation" regulations.

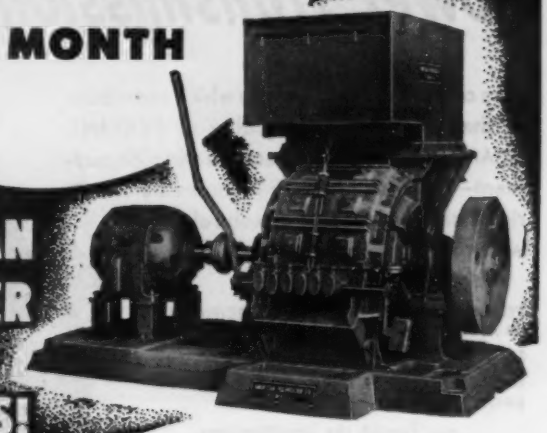
The agency is preparing to revise M-8 so as to allow a higher percentage of tin in solder. But for the present it has ruled out industry suggestions that a limited quantity of tin be permitted for items now prohibited.

Officials have also turned thumbs down on any relaxation for items currently restricted to less than the 90 pct overall quantity levels.

"Engineering was right. You don't read specs . . . you couldn't possibly."

IF YOUR METAL TURNINGS AMOUNT TO 10 TONS OR MORE PER MONTH

AN AMERICAN METAL TURNINGS CRUSHER can bring you NEW PROFITS!



AMERICAN #2400 METAL TURNINGS CRUSHER

A chip salvage system, with an American Metal Turnings Crusher at the core, can help you realize new savings and profits in metal, oil, man-hours, factory space, and tool maintenance. Consider these typical money-saving, money-making advantages of an American installation:

(1) **Brings $3 to $4 more per ton for chips** than for long machine shop turnings,

(2) **Reclaims 30 to 50 gallons of cutting oil per ton,**

(3) **Prolongs tool life** through more liberal use of recovered oil,

(4) **Saves 75% storage space . . .** permits heavier freight car loads . . . cuts shipping costs,

(5) **Easier, faster handling,**

(6) **Easier briquetting,** so essential for foundry and steel mill use.

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings Per Year.....$ 960.00 Per Year
(20 tons per month at $4 extra per ton)

3600 Gallons Cutting Oil Recovery at 30¢ Per Gallon..$1,080.00 Per Year
(30 gallons per ton x 240 tons=7200 gallons.
Half of this, 3600 gallons, can be credited to use of chips instead of long turnings.)

Estimated Savings on Manpower, Storage, Tool Maintenance, Freight, etc. .....$ 300.00 Per Year

TOTAL GROSS PROFIT
(Resulting from an American Installation).....$2,340.00 Per Year

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers

WRITE for American Rolling Ring Metal Turnings Crusher Bulletin.

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Specify PERKINS custom-made GEARS *for trouble-free power transmission*

One of the important factors which contribute to the consistent high quality of PERKINS GEARS is our modern heat-treating department—a section of which is shown below. At right is the Leeds-Northrup control panel which insures accuracy of temper.

PERKINS MAKES TO CUSTOMERS SPECIFICATIONS IN ALL MATERIALS, METALLIC & NON-METALLIC:

bevel gears, ratchets, ground thread worms, spiral gears, worm gears, helical gears, spur gears with shaved or ground teeth.

you furnish the specifications we'll produce the gears!

a New product

the PERKINS PRECISION SPRING COILER

This patented spring coiler turns out precision springs of any type, shape or size from wire sizes .005 to .125. Complete data and prices upon request.

Perkins Machine & Gear company

west springfield massachusetts

—Controls—

Ceilings Rise with Freight

Two changes just made in the government's price-setting orders allow sellers of a number of building and construction materials to adjust ceiling prices on delivered goods so as to reflect increases in outbound transportation rates authorized since Jan. 26, 1951.

Producers, manufacturers, and resellers making these adjustments must be certain the increases conform with the exact amount of outbound freight increases since Jan. 26, 1951, when dealing with items under General Ceiling Price Regulation, and since March 15, 1951, for items priced under Ceiling Price Regulation 22.

Materials affected include asbestos shingles and asbestos cement pipe, ceramic floor and wall tile, clay drain tile, gypsum products, structural clay products, blast furnace slag, sand and gravel, crushed stone and lime, except when used for agricultural liming, and cement.

Napthenic Acid Controls Dropped

Allocation controls were removed last week from napthenic acid as a result of the increasing supply over the past few months.

It has been under allocation since March, 1951, when rated orders were taking 50 pct of the supply, creating a tight supply situation for manufacturers of cutting oils, paint driers, and other items for civilian use.

Latest Government Appointments

Albert A. Carretta, member, FTC;

Richards W. Cotton, director, Electronics Div., NPA;

Myron G. Domsitz, chief, Ordnance Development Program A, reau of Standards;

Lee A. DuBridge, chairman, science advisory committee, ODM;

Charles Evans, assistant chief counsel, OPS;

Harold Goldberg, chief, Ordnance Development Program C, Bureau of Standards;

Wilbur S. Hinman, Jr., associate director, Ordnance Development Program, Bureau of Standards;

Drexel A. Sprecher, assistant administrator, SDPA.

English Oil Pipe Protection

Britain has applied cathodic corrosion protection to its newest oil pipeline. The line carries oil from Finnart, on Loch Long to a refinery at Grangemouth on the Firth of Forth, 57 miles away.

Cathodic protection operates by submitting another piece of metal to the electro-chemical corrosion that would normally take place on the pipeline. Because of the different kind of soil they pass through, steel structures such as pipelines have varying electrical potentials. As a result, a direct current flows out of the pipe at some points, travels through the soil and returns to the pipe at another point. Corrosion occurs where the current leaves the pipe.

Pipe Untouched—With cathodic protection a current is kept flowing steadily into the pipe and none flows out. This action is achieved by connecting a lump of metal of higher electrical potential such as magnesium, aluminum or zinc to the pipeline. The high potential metal generates its own current which flows into the line so that while the metal lump corrodes the pipeline is untouched.

On Britain's new pipeline, 22-lb magnesium lumps have been placed in 336 locations along the 46 mile line (about one every 7 miles). The magnesium is buried about 12 ft from the pipe and connected to it by wire, fusion-welded to the pipe. Engineers expect the magnesium to last 15 to 20 years.

"She's obsessed with the idea of conventions. Never misses one."

HOW NOX-RUST VAPOR-WRAPPER SAVES $15,000 PER YEAR FOR A LEADING MANUFACTURER*

Through use of an amazing new rust-preventive product . . . Nox-Rust Vapor-Wrapper . . . one of America's leading manufacturers* estimates that it has saved over $15,000 each year for the last two years in packaging costs alone. What's more, approximately 6,250 man-hours per year have been saved in the elimination of previous preservative packaging methods. Units now packaged in Vapor-Wrapper arrive clean, "factory-fresh," rust-free and ready for instant use. Thus, large savings in set-up time are made possible.

INDUSTRY SWITCHES TO VAPOR-WRAPPER

Vapor-Wrapper eliminates the need for application and removal of messy, old-fashioned rust-preventive coatings. Because of this fact, leading makers of automotive and aeronautical parts and equipment as well as other vital segments of the metal-working industry have switched to Vapor-Wrapper. For details on how your firm can benefit with Vapor-Wrapper, just mail the coupon below. You'll receive full information without obligation.

* Name on request

CAUTION . . . Only Nox-Rust makes the exclusive new Vapor-Wrapper that's impregnated with Cellex . . . the patented VOLATILE CORROSION INHIBITOR. (U. S. Patents 2,521,311—2,534,201—other patents pending).

Just Mail This Coupon (Please attach to your letterhead)

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2453 S. Halsted • Chicago 8, Illinois
Detroit • Baltimore • Philadelphia
San Francisco • Los Angeles

NOX-RUST Chemical Corporation
2453 South Halsted
Chicago 8, Illinois
Please send me full information on how my firm can benefit through use of Vapor-Wrapper.

Your Name_____

Address_____
(If different from letterhead)

City_____ State_____

Quiet... Clean... Safe

Because they are quiet, clean and safe, battery industrial trucks can be used without restriction in virtually any department of the plant or warehouse including confined quarters as well as areas devoted to processing foods, pharmaceuticals and other products demanding utmost cleanliness. They can even be provided with spark-enclosed construction for operation in hazardous locations.

They use low-cost electric power for battery charging; and they use it with maximum economy, because they start instantly, yet consume no power during stops. With electric-motor drives and EDISON Nickel-Iron-Alkaline Storage Batteries, they have a minimum of wearing parts; are easy to maintain, are rarely out of service for repairs. With batteries exchanged at convenient intervals, they operate around the clock with the highest dependability and lowest overall operating costs.

EDISON batteries have these important features:

They are durable mechanically; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

They can be charged rapidly; gassing cannot dislodge the active materials.

They withstand temperature extremes; are free from freezing hazard; are easily ventilated for rapid cooling.

They are foolproof electrically; are not injured by short-circuiting, reverse charging or similar accidents.

They can stand idle indefinitely without injury. Merely discharge, short-circuit, and store in a clean, dry place.

They are simple and easy to maintain.

As a result of these features, they are the longest-lived of all storage batteries. In fact, they have such long life that they effect important economies in depreciation charges. And they are so trouble-free that they cut maintenance charges too. Send for bulletin *Modern Material Handling* for further details of the advantages of electric-motor drives and EDISON batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

You can always rely on

EDISON

Nickel-Iron-Alkaline Storage Batteries

—Defense Contracts—

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Commandant, Marine Corps, Washington.
Desks, office, steel, 1325 ea, 1394B, June 26.
Spare parts for power unit, 291 itms, 1327B, June 26.
Air-conditioning units, 782 ea, 1211B, June 27.

Ordnance Tank Automotive Center, Detroit.
Bushing, 25000, 52-4144B, June 30.
Lever, 1700, 52-4144B, June 30.
Cover, 8000, 52-4173B, June 30.
Tool spotfacer, 2140, 52-4149B, June 30.
Gun, oil recoil, 4250, 52-3883B, June 20.
Drive, ord drg no. D77843, 3300, 52-4194B, June 30.
Pulley, 9000, 52-4194B, June 30.
Shaft, 1600, 52-4157B, June 30.
Pin, 1200, 52-4157B, June 30.
Lever, 1000, 52-4157B, June 30.
Handle, 1900, 52-4157B, June 30.
Yoke, 3000, 52-4157B, June 30.
Pin, 2800, 52-4157B, June 30.
Breaker, 3300, 52-4192B, June 30.
Bolt, connecting rod, 12000, 52-4198B, June 30.
Lever, 2800, 52-4123B, June 27.
Yoke, 1700, 52-4123B, June 27.
Plate, 2000, 52-4123B, June 27.
Arm, 220, 52-4123B, June 27.
Shifter, 1000, 52-4123B, June 27.
Clip, 11000, 52-4193B, June 27.
Bearing wheel link pivot, ord drg no. A324779, 3500, 52-4193B, June 27.
Support, 1200, 52-4193B, June 27.
Holder, 3000, 52-4193B, June 27.
Column, 3500, 52-4193B, June 30.
Jack, hydraulic, 2100, 52-4154B, June 27.
Cradle assy, 1000, 52-4143B, June 27.
Guard, 3500, 52-4143B, June 27.
Frame, 3000, 52-4143B, June 27.
Cover, 5000, 52-4143B, June 27.
Kit, 4000, 52-4143B, June 27.
Base, ord drg no. B7385347, 500, 52-4143B, June 27.
Lock, 1002, 52-4143B, June 27.
Chute, 3000, 52-4143B, June 27.
Support, 1080, 52-4143B, June 27.

General Stores Supply Office, Philadelphia.
Cans, steel, 16596 ea, O 1083B, June 26.

Corps of Engineers, Chicago.
Hoist, chain, 3426 sts, B-599B, June 18.
Drill, pneumatic, 534 ea, B-610B, June 18.
Drifter, drill, 200 ea, B-610B, June 18.
Tamper, backfill, 876 ea, B-610B, June 18.
Compressor, air, 484, B-616B, June 18.

Corps of Engineers, Pittsburgh.
Carriage, tramway, 155 ea, Eng-36-058-52-180B, June 19.
Angle, splice, tower, 576 ea, Eng-36-058-52-180B, June 19.
Stake, anchor, 800 ea, Eng-36-058-52-180B, June 19.
Bolt, bracing, 29000 ea, Eng-36-058-52-199B, June 19.
Pedestal, ramp, 1575 ea, Eng-36-058-52-199B, June 19.
Baker, 2850 ea, Eng-36-058-52-199B, June 19.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Repair parts, 358 line items, $171,815, General Motors Corp., Detroit, *J. E. McKenna.*

Arc welder, 155 units, exceeds $250,000, Victory Equipt. Co., Los Angeles.

Winches, spare parts, 90 ea, exceeds $250,000, Skagit Steel & Iron Works, Wash.

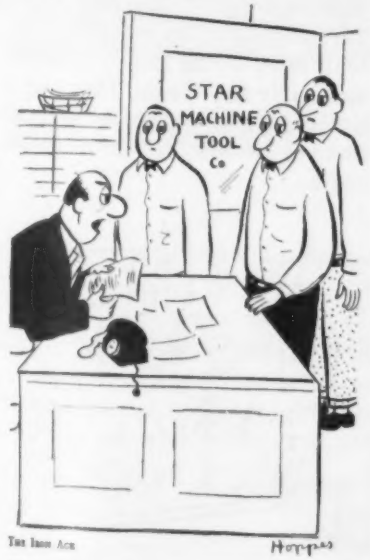
Spare parts, var, $116,335, Caterpillar Tractor Co., Peoria, Ill.

Spare parts, var, $41,126, Gray Marine Co., Detroit.

Spare parts, var, $42,949, Knorr Maynard, Inc., Detroit.

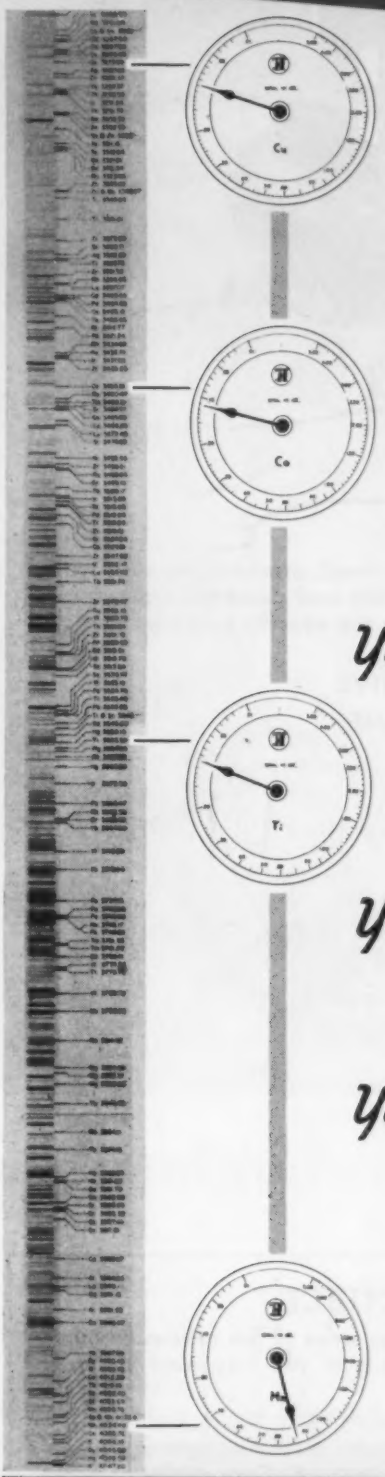
Spare parts, var, exceeds $250,000, Caterpillar Tractor Co., Peoria, Ill.

Spare parts, var, $67,199, Caterpillar Tractor Co., Peoria, Ill.
Spare parts, var, $64,462, Electric Auto-Lite, Toledo.
Spare parts, var, $29,110, Balderson, Inc., Wamego, Kan.
Spare parts, var, $31,170, United Motors Service Div., Detroit, *R. C. Campbell.*
Spare parts, var, $70,324, Iowa Mfg. Co., Cedar Rapids, Iowa.
Spare parts, var, $78,287, Le Tourneau, Inc., Peoria, Ill.
Spare parts, var, $34,922, Electric Auto-Lite Co., Toledo.
Spare parts, var, $59,295, Waukesha Motor Co., Waukesha, Wis.
Spare parts, var, $48,298, Caterpillar Tractor Co., Peoria, Ill.
Spare parts, var, $84,082, Iowa Mfg. Co., Cedar Rapids, Ia.
Spare parts, var, $28,274, LeRoi Co., Milwaukee.
Spare parts, var, $31,596, Mutual Truck Parts Co., Chicago.
Spare parts, var, $149,281, Caterpillar Tractor Co., Peoria, Ill.
Spare parts, var, $109,131, Bucyrus Erie Co., Evansville, Ind.
Spare parts, var, $141,337, Caterpillar Tractor Co., Peoria, Ill.
Spare parts, var, $44,894, Huber Mfg. Co., Marion, Ohio.
Spare parts, var, $206,841, Baldwin-Lima-Hamilton Corp., Lima, Ohio, *P. R. Ehrgott.*
Spare parts, var, $184,650, Bower Roller Bearing Co., Detroit.
Spare parts, var, $38,378, Tyson Bearing Corp., Massillon, Ohio.
Spare parts, var, $27,705, Roller Bearing Co., Trenton.
Spare parts, var, $64,804, Timken Roller Bearing Co., Canton.
Shell, HE, 75mm, 300000, exceeds $250,000, Murray Co. of Texas, Dallas.
Signal, aircraft, tracer, 188000, $178,600, Monarch Mfg. Co., Ft. Worth.
Ring & cap front & rear assys, 15000, $67,575, Redfield Gunsight Co., Denver.
Shell, HE, 4.2", M329, exceeds $250,000, Thermador Electrical Mfg. Co., Los Angeles, *John Marshall.*
Shell, illuminating, 60mm, M83A1, exceeds $250,000, Kwikset Locks, Inc., Anaheim, Calif.
Fuze, PD, M503A1, MPTS, exceeds $250,000, Price-Pfister Brass Mfg. Co., Los Angeles.
Primer, percussion, M54, $100,000, Tubing Seal Cap, Inc., San Gabriel, Calif.
Booster, M21A4, exceeds $250,000, Clary Multiplier Corp., San Gabriel, Calif.
Spare parts, cable system,10050, $32,975, Merkle Metal Products Corp.
Valve assy, 500, $34,750, Allied Specialties Co.
Head assy, 3000, exceeds $250,000, Rudolf Wendel, Inc.
Gaging dies, 1392, $33,660, Ellendy Eng. & Sales.
Spare parts, $231,327, Bay City Shovels, Inc., Bay City, Mich.



"Washington can't get us any more tools . . . Can you figure out a way to machine in thin air?"

APPLICATION OF *Arithmetic*



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— 5 minutes

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750
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ALLOY TROUBLE?

If you have missed the special Iron Age series of five articles on boron steel which appeared last July and August you may want to order a reprint.

A 30-page reprint booklet covers the following:

1. Boron steel alternates for standard grades. 2. Advantages and limitations of boron steels. 3. Hardenability charts. 4. Case studies of boron steel use in plants making gears . . . pinions . . . springs . . . bolts . . . axles.

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100 East 42nd St., New York 17, N. Y.

—Construction—

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

2500 **Tons,** Bethlehem, bridge on Saucon-Freemansburgh Road for Philadelphia, Bethlehem & New England R. R. Co., to Bethlehem Steel Co., Bethlehem.
945 **Tons,** Marietta, Ohio, bridge to Bates and Rogers Construction Corp.
400 **Tons,** Dayton, machine shop to Charles H. Shook, Dayton.
400 **Tons,** Velasco, Texas, power plant for Dow Chemical Co., through Stone Webster Engineering Corp., Boston, to Mosher Steel Co., Houston.
185 **Tons,** Media, Pa., Delaware County Court House & Garage, to Norris Iron & Wire Co., Norristown.

Fabricated steel inquires this week include the following:

3000 **Tons,** Berks, Schuylkill Counties, Pa., five bridges, U. S. Route 22, Pennsylvania. State Dept. of Highways, to be re-bid July 18.
2300 **Tons,** Somerville, N. J., plate work for tank farm, Veteran's Administration Supply Depot, General Services Administration taking bids.
658 **Tons,** Boston, Mass., construction of viaduct and roads, James J. Storrow Memorial Drive. Completion date May 1, 1953.
400 **Tons,** Smyrna, Tenn., Stewart A. F. Base.
400 **Tons,** Akron, hangar.
300 **Tons,** Anniston, Ala., Ordnance Depot.
270 **Tons,** Philadelphia, bridge, Pennsylvania State Dept. of Highways, bids due July 11.

Housing Starts at Peak in May

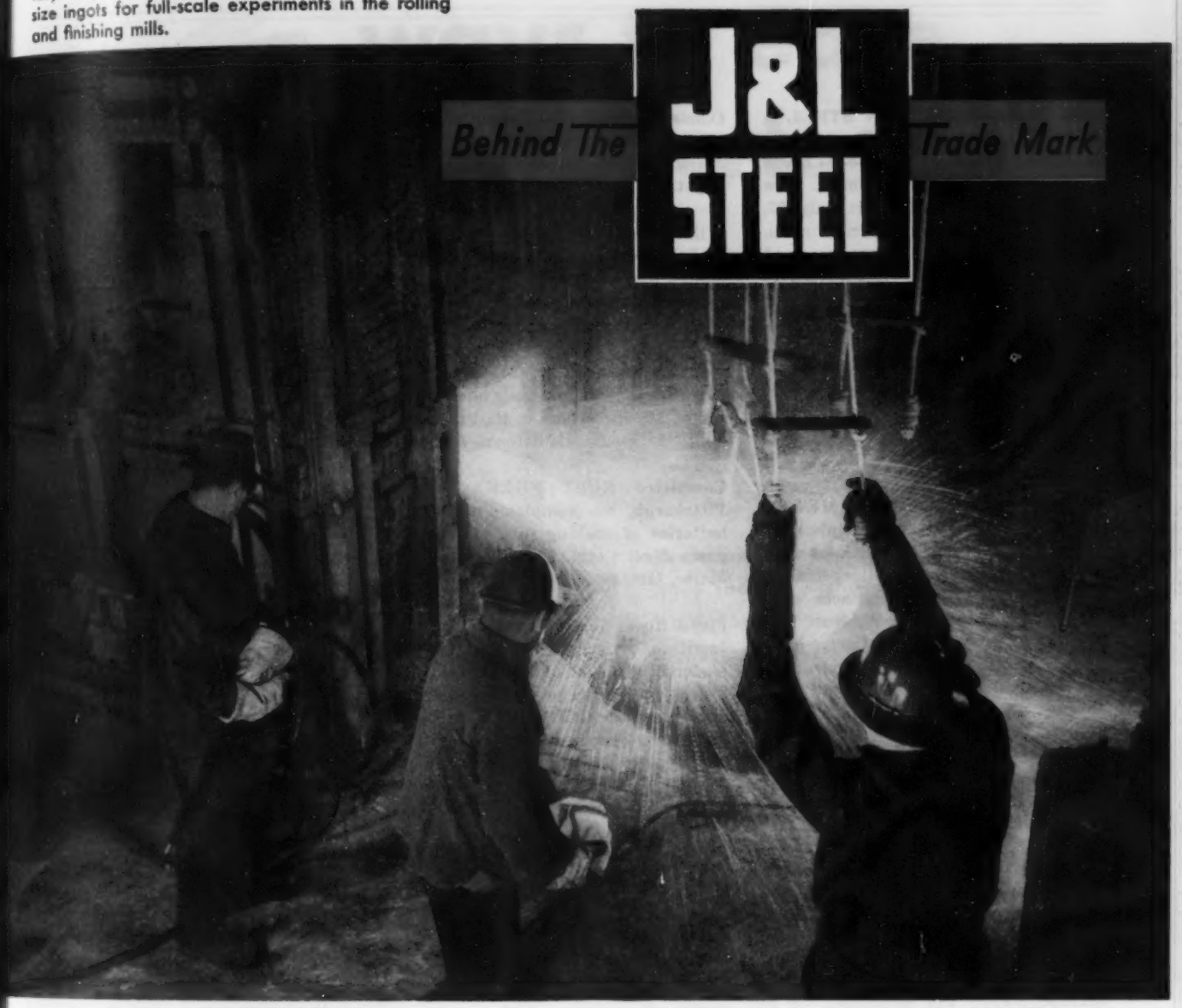
In spite of some strikes in the building trades and stiff credit requirements, housing starts in May totaled up to 107,000 units, at record levels for the month.

For the first 5 months, the total of housing starts are listed by the U. S. Bureau of Labor Statistics at 455,600 units, just about 1951 level and including 38,000 public housing units.

Housing officials now concede that residential building will go past the 1 million mark—unless a long steel strike causes a summer and early fall slump. They had estimated last December that the number would be about 800,000 units.

"Miss Conklin, I'll be busy with some new designs for the next hour."

The pilot open hearth furnace, pioneered by J&L, is an important unit of research equipment. This four-ton capacity furnace, under complete laboratory control, is capable of producing production size ingots for full-scale experiments in the rolling and finishing mills.



photograph by d'Arazien

The "watch" over quality is never-ending . . .

THE term "steel quality" has almost as many meanings as there are uses for steel. No steel is equally well suited for all purposes. There are degrees of strength, corrosion resistance, machinability, resistance to abrasion, and many other properties of steel. Steelmaking and finishing processes must be under strict metallurgical control if the required quality is to be duplicated in successive lots of steel.

The most important factor in the control of steel quality is the need of the steel user. The steel is made to specifications that are designed to fit his individual requirements.

Quality control is a continuous function at J&L. Beginning with raw materials, the "watch" over quality is maintained through every step of production and finishing operations. The efforts of skilled workmen, applied to the most modern production equipment, are coordinated with technological information developed and interpreted by J&L research personnel.

The J&L trademark is recognized as a symbol of consistent and dependable quality to steel users in all branches of American industry.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Industrial Briefs

Coke Ovens—AMERICAN STEEL & WIRE CO., has announced plans for rebuilding a battery of 45 coke ovens at the Cleveland Coke Works. New installation, slated to start July 27, will feature a new collecting main. The new main plus rebuilding of ovens from ground up is expected to reduce air pollution in the area.

Expansion—APEX SMELTING CO., Chicago, has acquired 20 acres in the Los Angeles industrial area where it will construct a plant which is expected to be producing aluminum alloys by late fall.

New Subsidiary—ARTISAN METAL WORKS, Cleveland, has established a new subsidiary company, known as Clevecote, Inc., which will specialize in the coating of metal surfaces with a silicone glaze. Process was developed by Dow Corning Corp., Midland, Mich. Equipment and cleaners were manufactured by Detrex Corp., Detroit.

Honorary Degree — Louis S. Barry, vice-president, L. B. FOSTER CO., was awarded an honorary degree in engineering by Stevens Institute of Technology, Hoboken, N. J.

New Film—FEDERAL PRODUCTS CORP., Providence, has a new 16 mm, full-color sound film *Gaging For Profit*, which shows modern methods of gaging for control of dimensional accuracy. Film will be loaned for 1 and 2-day showings to manufacturers.

Distributor Appointed—Four States Machinery Co., has been appointed exclusive distributor in Chicago and Milwaukee for KINGSBURY MACHINE TOOL CORP., Keene, N. H.

Award Presented — Ralph N. Cole, president, Canton Malleable Iron Co., Canton, Ohio, was presented with the 1951 McCREA MEDAL, which is awarded annually for outstanding service to the malleable castings industry. The presentation was made as the climax of the Malleable Founders Society's annual banquet held at The Homestead, Hot Springs, Va., by Wilson H. Moriarty, vice-president of National Malleable & Steel Castings Co., Cleveland.

Officially Opened — Recently HARNISCHFEGER CORP., officially opened its new Diesel Engine Div., in Crystal Lake, Ill.

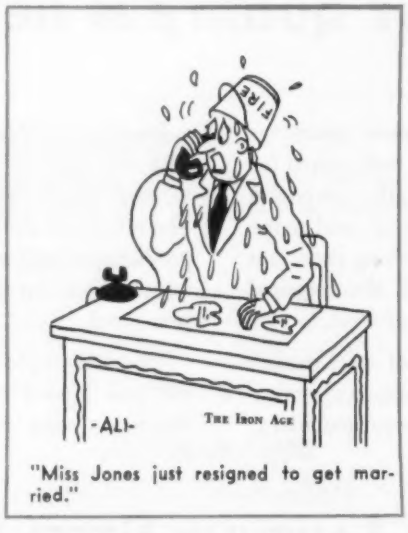
Will Build—WESTINGHOUSE ELECTRIC CO., has announced it will build a multi-million-dollar fluorescent fixture plant at Vicksburg, Miss., on a 53-acre site recently acquired.

New Plant—THE DU-LITE CHEMICAL CORP., has just completed transfer of all operations to its new plant on River Road, Middletown, Conn.

Completed—RUST FURNACE CO., Pittsburgh, has completed three new batteries of soaking pits for the Algoma Steel Corp., Ltd., at Sault Ste. Marie, Ontario.

Plays Host—The Industrial Research Institute, Inc., New York, under the leadership of Dr. Fred Olsen, vice-president in charge of research and development, OLIN INDUSTRIES, INC., and president of the Institute, was host recently to 18 European research scientists from Mutual Security countries. Guests have just completed a 6-week tour of American and Canadian research facilities.

Near Future—Construction will commence in the near future on a $1-million plant on a 17-acre site at Mathews Road & Southern Blvd., Boardman, Ohio, for METAL CARBIDES CORP., Youngstown, Ohio.



"Miss Jones just resigned to get married."

Something New—Tool kits are something new in the line of American gift packages. CARE has added several tool packages to its long line of food and textile packages. Latest of these CARE tool kits, priced at $20, is a carpenter's and joiner's set. Kit was especially designed by CARE for West Germany.

Organize Center — A CINCINNATI TOOL & DIE CENTER has been organized by local tool and die manufacturers who have become affiliated with the National Tool & Die Manufacturers Assn. This center is equivalent to a local chapter of the organization.

Groups Integrated—Research Dept. of Sharples Chemicals, Inc., will be integrated with Research & Development Div., of the parent company, PENNSYLVANIA SALT MFG. CO. Integration will occur between June 15 and Sept. 15.

Down-To-Earth—RISH EQUIPMENT CO., Richmond, Va., recently assembled $250,000 worth of equipment in an abandoned gravel pit, put its 80-man sales and executive staff in overalls and had them spend 4 days operating the various machines. This operation was appropriately called "Operation Field Experience."

Canadian Distributor — CONTROL ENGINEERING CORP., Canton, Mass., has appointed Peacock Brothers, Ltd., as exclusive distributor in Canada.

Separate Division—THE TORRINGTON MFG. CO., Torrington, Conn., has established a separate division for sales and other activities.

Expansion—To provide added facilities for its titanium forging operations CONSOLIDATED INDUSTRIES, INC., West Cheshire, Conn., is expanding plant capacity. Expansion includes several new and large drop hammers to provide a complete size range.

Foreign Subsidiary—FERRO CORP., Cleveland, recently opened its tenth foreign subsidiary in Osaka, Japan.

2 ways to ease your Steel Shortage

1 Collect all dormant Steel Scrap and get it to the steel producers

Millions of tons of valuable scrap still lie idle in America. Scrap salvage means more production—a stronger America. Clean out your plant . . . sell all your iron and steel scrap to your local scrap dealer now. The need is urgent. Every bit will help to meet the needs of defense production.

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Users of N-A-X HIGH-TENSILE steel find they can make 3 tons do the work of 4. Through its high strength and corrosion-resistant properties, lighter sections can be used without sacrifice of quality. It fabricates and welds with the ease of mild carbon steel. Let us assist you in applying this economy to your products.

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N-A-X Alloy Division — Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION

Diesel Trucks Closing In Fast

Diesel powered trucks making bid for leadership in freight hauling . . . Expense still a stumbling block but savings on long mileage routes are considerable—*By R. D. Raddant.*

Along the truck stops from coast to coast a significant change is taking place. The diesel powered truck, once the highway's ugly duckling, is not only being accepted but is making a serious bid for leadership with highway freight haulers.

The diesel's rise is little short of meteoric. Since 1946 the proportion of diesels in the heavy duty bracket has increased from 5 pct to 22 pct. Indications are that its popularity will continue to increase.

To earn its present favor, the diesel had to overcome many shortcomings. Its initial cost was greater. It was heavier than its gasoline counterpart. Maintenance men skilled in diesel repair were few, as were stations where diesel fuel was available.

Smoky Issue—And many diesels had BO. Fumes and clouds of oily smoke that followed many of them made diesels distinctly unpopular on the highway. In general, most of these conditions have now been remedied or compensated.

The first shortcoming of a diesel is its expense. GMC Truck and Coach Div., the country's biggest manufacturer of diesel trucks as well as a major producer of trucks in all weight categories, say a 4-cylinder GMC diesel D6 30-47 truck costs $8,042.96 against $5,995.09 for a comparable gasoline truck.

This leaves a cost difference of $2,047.87 that a diesel must make up in efficiency.

Obviously, on small mileage routes a diesel cannot save money. Mileage of 50,000 per year is considered necessary before a diesel becomes practical. The greater the mileage the more the economy.

Economy Tests—Diesel economy is shown in figures compiled by GMC in a survey conducted with the National-American Wholesale Grocers Assn.

A total of 29 gas tractors were studied for 1,052,321 total miles. Costs of $88,000 are broken down to $19,921 for depreciation, $24,107 for maintenance, and $44,392 for fuel and oil.

Twenty-six diesel tractors covering a total of 1,011,924 miles over the same hilly terrain cost $21,526 for depreciation, only $2,371 for maintenance, and $23,141 for fuel and oil, totaling $47,038.

A similar study of 26 tractors of each type over level terrain showed total costs of $73,000 for gas tractors and $52,000 for diesel. Obviously diesels are also more economical in flat country, but they pay off faster in rugged territory.

The longevity of the diesel is amazing. GMC advertises its product as "million milers" if properly maintained.

Aluminum Parts—Weight is a problem, particularly in these days of strictly enforced highway weight limits. To offset this factor, many aluminum parts are optional equipment.

To a great extent, the smoke and fumes have been largely eliminated. A poorly maintained diesel, particularly if low grade fuel is used, can still be a nuisance on the highway. GMC claims that with No. 1 fuel, a properly maintained diesel will not smoke.

The maintenance problem was more difficult and had to be met with a long term view. To meet the demand for trained mechanics, GMC launched four mobile diesel truck service training schools in 1950. The schools will be continued indefinitely.

Tire Cuts — Truck owners are welcoming the news of price cuts for truck tires but none are scheduled for passenger car tires. Automobile tubes are dropping in price in some cases.

Goodyear cut prices on truck tires 7½ pct for large sizes to 2½ pct for smaller sizes. Truck and auto tubes will be reduced 5 pct and farm tractor tubes 7½ pct. The price cuts were due to a drop in natural rubber costs. But so little is used in passenger car tires that savings were not enough to result in price reductions.

Nonferrous:

Nickel is only remaining shortage; other metals now in good supply.

Impact of the steel strike which hit the automotive industry with its first shutdowns this week has taken the spotlight away from nonferrous metals. Once the danger spot in auto production, the situation is no longer critical and most nonferrous metals are in good supply. The outstanding exception is nickel which is in extremely short supply for non-defense production.

The additional cost of copper brought about by the lifting of the ceiling on Chilean imported copper was generally offset by the assurance of a good supply. One estimate is that the higher price will add about $4 in cost to the average auto.

This may not be as bad as it sounds. Even at new higher prices substitutes are more expensive than copper. In some cases, notably radiators, adequate substitutes have not yet been developed.

Scarcity of nickel has been eased by substitutes to such an extent that its shortage has no serious effect on production.

Lifting of controls in May from lead, cadmium, antimony and zinc is evidence that these metals are not a subject for concern. Other specialized products such as powdered metal products and molybdenum wire, rods and sheets appear to be in fair supply.

Smaller Carburetor Developed

A new carburetor, smaller and lower than its predecessor, has been developed by Chrysler. Constructed of aluminum die castings, it weighs about half as much as the former zinc model.

Thomas M. Ball, head of the Chrysler carburetor laboratories, said it was developed because of the need to reduce the height of the carburetor to fit under the lower hood lines of today's body styling. Substitution of aluminum for zinc was to save weight and conserve zinc.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
June 21, 1952	101,522*	28,052*	129,574*
June 14, 1952	102,422	28,122	130,544
June 23, 1951	124,570	34,339	157,909
June 16, 1951	122,112	34,914	157,026

*Estimated

Source: *Ward's Reports*

Rotary Electric Settles Strike

Rotary Electric Steel Co. ended the strike at its Detroit plant, agreeing with the union to wages based on the last offer made by the major steel companies on June 9.

A major factor in the settlement coming in advance of industrywide agreement is the fact that the company has had a union shop for some years. This eliminated the basic stumbling block from negotiations.

Three-Shift Crews—In addition, Rotary has operated with only three crews on a three-shift basis and previously provided for time-and-a-half for Sunday work. This plan will continue for the duration of the contract as long as operations are conducted with only three crews.

The union agreed that for three months following the date of agreement, no strike will be called for other than a grievance and then only if the company refuses to arbitrate or to abide by an arbitration decision.

N. K. Schnurr, Rotary president, said that the union agreed to forego time off for vacations during the current year. In return the company will distribute regular vacation pay. The contract included increased shift differentials, six paid holidays and other minor fringe benefits.

THE BULL OF THE WOODS — **By J. R. Williams**

M-M-M! A GREASE MONKEY MAKIN' PEOPLE THINK HE'S AN EXECUTIVE ER A BANKER ON TH' WAY HOME!
NO! JUST KEEPIN' PEOPLE FROM THINKIN' I'M A BUM! AN OWL IS SMART TO PEOPLE ONLY BECAUSE HE LOOKS IT--MY GRAN'PA TOLD ME IF YOU CAN'T RISE IN YOUR PROFESSION, RAISE TH' PROFESSION!
A MATTER OF PRIDE
T. M. Reg. U. S. Pat. Off. Copr. 1952 by NEA Service, Inc.
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J.R.WILLIAMS

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Throughout the entire manufacturing process, the quality of "DESEGATIZED" Hi Carbon-Hi Chromium Die steels is constantly controlled. From initial chemical analysis to final inspection of finished product—test after test, after test. That is why the user of these, the very finest die steels, is guaranteed

- ease of die fabrication
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- Detroit
- Hartford
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- Philadelphia
- Toledo
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Latrobe's metallurgical laboratory, completely modern, is staffed by technicians experienced in both the metallurgy and the application of die steels. These men can be of great assistance in the solution of production problems through

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- Disc inspection service
- Field service—selection of steels, proper equipment for working and heat treating assistance.

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Truman Steel Strike Emergency Fades

Speculate on manner of imposing Taft-Hartley injunction . . . President has full responsibility, may use law early in July . . . Election year tempo is having its effects—*By G. H. Baker.*

There's no escaping that the President's hedging reluctance to use the Taft-Hartley Act to bring steelworkers back to work refutes his former position that any means should be taken to resume steel production. Mr. Truman's "emergency" of 2 weeks ago seems to have completely evaporated.

To anyone less shrewd than Congress, the President's liberal use of desperation adjectives in his personal appeal to Congress meant that he honestly wanted the steel strike to end as soon as possible.

Obviously this is not the case. What the White House really wanted was a chance to duck the Taft-Hartley issue. Fact that Mr. Truman now has clearly lost his battle for new seizure powers raises new speculation as to when and how the Taft-Hartley law may be used to restore steel output.

Not Forced—Also, as a political blunderer Mr. Truman has few peers. In disqualifying any obligation to heed Congress (supposedly the will of the people) in deciding to impose Taft-Hartley, he simultaneously assumed full responsibility for using the law. He can no longer pretend he was coerced by Congress. Some informed opinion at the Capitol now shapes up this way:

Mr. Truman will probably bide his time for at least another week. But sometime in early July, he may announce "with great reluctance" that he is instructing the Attorney General to seek Taft-Hartley back-to-work injunctions. Court hearings and official deliberation would delay issuance of the injunctions for about 2 weeks.

Then, in late July, Phil Murray (with tongue in cheek) would "order" the steelworkers back to the mills. Production would stagger along by fits and starts until the 80-day cooling off period had elapsed—about mid-October. Then, if settlement had not yet been reached, Mr. Truman would denounce the "ineffectiveness" of the Taft-Hartley law with all the vehemence at his command.

And Mr. Truman Said:

"The fact-finding (labor) board in the steel industry has reported to me informally. It has not had the opportunity to go into the merits of the case very fully, as it would have done if there were legislation on the books for a 'cooling off' period."

THE IRON AGE, Jan. 24, 1946.

It's important to keep in mind, however, that final agreement on the union-shop impasse still may be reached within a short time, thus precluding any White House necessity for seeking a Taft-Hartley injunction.

Re-election in Mind—The tempo of an election year has at least one wholesome effect upon Washington: With the entire House membership and one-third of the Senate up for re-election, congressmen are compelled to vote quickly and accurately the views of their constituents. To lag behind public thinking in an election year is to write a finish-mark to a political career.

But bureaucrats, owing their jobs only to the White House and to no voter, usually lag weeks behind the slowest congressman in keeping up to snuff as to what the public thinks—and wants. Here's one recent example:

Incredulous — Last week, Economic Stabilizer Roger L. Putnam had just concluded writing a scholarly ("Engaged as we are in a world-wide struggle of vast proportions") letter to the House Banking Committee, urging termination of the Capehart and Herlong provisions of the Defense Production Act. Neither political party has any intention of repealing these two provisions.

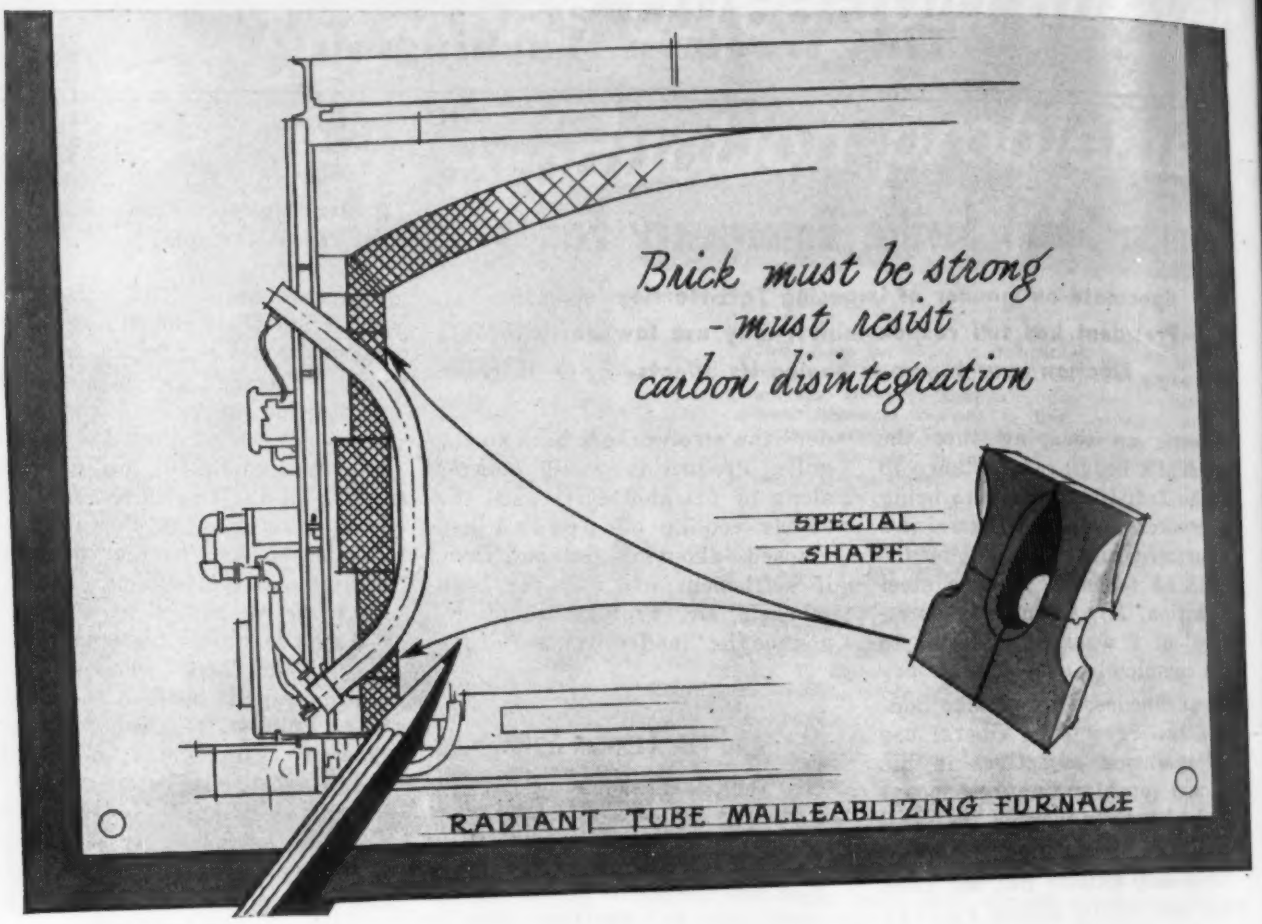
As he read over his 4-page display of academic economics, an aide poked his head in the door: "Mr. Putnam, the House Labor Committee just voted to abolish the Wage Stabilization Board." Putnam could hardly believe what he heard. As one congressman puts it: "Roger ought to stop talking and start listening—if he wants to know how people really feel about controls these days."

* * *

Lead Cushion—Government stockpiling of lead — for strictly civilian consumption—is about to get under way. General Services Administration, which has had its eye on such a project for many months, is now about ready to embark on an extensive lead-buying program. Immediate goal: A 40,000-ton non-military stockpile by the end of this year.

Project now awaits clearance only by the Bureau of the Budget. GSA does not require any new appropriations of funds. It proposes to start this year's operations with general-purpose funds already available to it at the U. S. Treasury.

All buying under the new program would be contracted for at going market prices of lead. Any amounts purchased in excess of stockpiling goals would be offered for sale to the Munitions Board for its military stockpile. Then, if the Munitions Board expressed no interest, the surplus would be offered for sale to defense contractors.



Which insulating fire brick would you use?

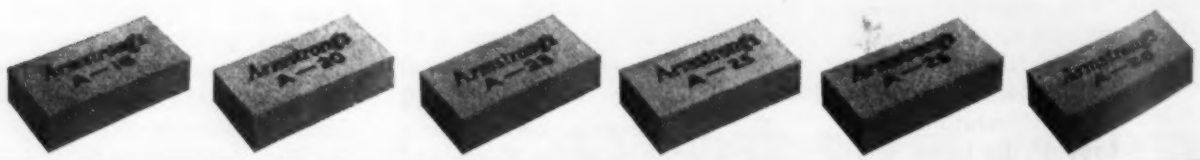
Every furnace presents a different problem in insulating fire brick selection. Unit design and operating conditions must be carefully considered before you can choose the best brick for the job.

For example, take this radiant tube furnace used for malleableizing gray iron castings at 1300° to 1700° F. As the castings are heat treated, they create a high carbon atmosphere which attacks the furnace lining. Also, since this is a bell-type furnace, the insulating fire brick lining suffers mechanical and thermal shock as the cover is raised and lowered over the charge.

Both these conditions recommended Armstrong's A-23 Fire Brick for this job. A-23's offer outstanding resistance to carbon disintegration—the primary problem here. In addition, A-23's great strength provides maximum protection against damage during lifting. Finally, A-23's top temperature limit of 2300° F. provides a good margin of safety in this application.

The intake and exhaust ports of this furnace posed an additional problem. This was economically solved by using Armstrong's A-23 Fire Brick, machined at the factory in special shapes. These special shapes eliminate the expense of shaping standard brick by hand, make the bricklaying job quicker and better. They provide proper clearance for tube expansion, allow easy installation and removal of the tube without disturbing the furnace wall. Armstrong's special shapes have sharp, clean corners for easy handling and heat-tight joints.

Armstrong offers six types of Insulating Fire Brick, each formulated to give you the best balance of physical properties. The choice depends on the application. An Armstrong engineer will gladly advise you in selecting the right brick for your job. Next time you have a furnace insulation problem, call your near-by Armstrong office or write direct to Armstrong Cork Co., 4906 Mulberry St., Lancaster, Pa.



ARMSTRONG'S INSULATING REFRACTORIES

Copper:

Congressional blasts at IMC may slow U.S. approval of quotas.

Following congressional blasts at International Materials Conference, agency which recommends world allocations of several scarce metals and minerals, U. S. officials may make a longer appraisal of the American copper quota. On the fire now are IMC's recommended third quarter allocations of copper and nickel-cobalt distribution for July to September.

Normally agreement on allocations comes very quickly from member nations. But because some congressmen have labeled IMC a "super cartel," the cause of the U. S. copper shortage, and a sinister arm of the State Dept., more statistics will be covered to make certain that the U. S. gets its rightful due in raw materials.

Because of easing in zinc supply, IMC is no longer concerned with that commodity. The manganese - nickel - cobalt committee has stopped asking member nations for supply data on manganese. Allocations have also been stopped on newsprint and cotton—cotton linters quotas have been suspended for a period.

Tin Can Shredding Plant Wanted

National Production Authority was scrounging through Denver, Seattle and San Francisco recently seeking for someone to set up a tin can shredding plant. Shredded cans have proved the cheapest and best source of attracting previously wasted copper from mine water. Only shredder, however, is currently located in Los Angeles. Cost is from $60,000 to $500,000 depending on size. If necessary, a mobile shredder may also be sought to tour small towns.

NPA is currently getting 5400 tons of tin cans per month from Southern California and Arizona. Minimum requirements of copper mines are 7600 tons. Deficit means a ton of copper lost for every missing 1.25 ton of cans. In addition, over 4000 extra tons will be needed when the Yerington, Nev., mine opens late this year. This mine will also need a stockpile of 18,000 tons to start. And others in the state are expanding.

More Loans for Small Firms

Three more metalworking plants are included in the latest list of small companies approved for government loans by Small Defense Plants Administration. The loans total $840,000. Firms, loan approved, and purposes as stated by SDPA are:

Langley Corp., San Diego, Calif., $562,000, new machinery and buildings, manufacturers of aircraft assemblies.

C. L. Bryant Corp., Cleveland, O., $250,000, stoves, furnaces, heaters.

Scott-Browne Corp., Cincinnati, $28,000, parts for jet planes, tanks.

What About Mesabi?

Last week's 43-40 Senate turndown on the St. Lawrence Seaway project leaves the program up to the next Congress. Before the vote President Truman had given the lawmakers some curious views:

"If Canada builds the waterway, and they expect to build it, we will pay toll on every ton of steel that comes from the iron deposits in Labrador," Mr. Truman predicted. "It has become necessary for us to import nearly all our iron from Labrador, Liberia, and Venezuela," he continued.

"This waterway would prevent our steel mills in the Midwest from moving to the East Coast. That situation happened to the textile mills of New England and I don't want to see it happen in the case of Midwest steel mills."

Chairman Connally, D., Tex., of the Foreign Relations Committee, a long-time opponent of the seaway project, said the project had been parked in this committee room so many years it would be "lonesome" if it were not sent back there.

Conservation:

Improved equipment design saves materials, money for the Army.

Conservation measures improved by equipment modifications and changes in specifications earlier this year will result in a saving of more than 500 tons of copper and nearly 250 tons of steel in the present quarter alone, the Army estimates.

Basic factor in the campaign to save quantities of critical, short-supply materials is the substitution of more plentiful, less essential items in production of equipment. Simplified design has helped to make this substitution effective.

One example of the conservation is furnished by Army Ordnance, which has found that lean alloy steels can be used in certain tank and artillery components without weakening the battleworthiness of the product. This substitution has permitted the service to save manganese, nickel, molybdenum, and chromium.

Quartermaster Corps, substituting carbon steel for brass in buckles and clips on such items as helmet chin straps and gloves, has saved a sizable amount of copper and zinc.

Figures on estimated savings of nine critical materials in the April-June quarter are:

Copper—1,010,137 lb
Steel—493,890 lb
Zinc—425,856 lb
Aluminum—226,445 lb
Vinyl film—163,350 lb
Seamless steel tubing—110,013 lb
Nickel—145,023 lb
Manganese—12,091 lb
Molybdenum—5,288 lb

Extend Export License Deadline

Closing date of the filing period for third quarter export license applications covering secondary tinplate products has been extended by the Office of International Trade to July 18.

At the same time, OIT said that on and after Aug. 4, license applications to ship goods to Austria must show the Austrian import identification number.

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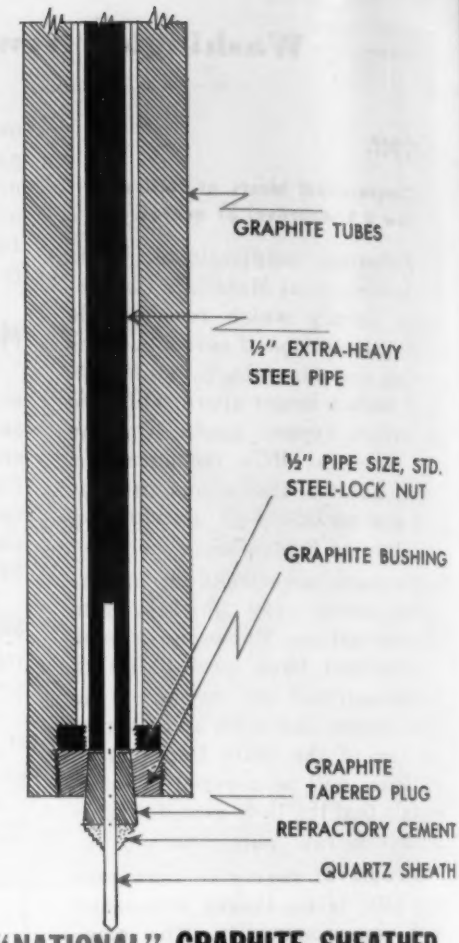
● High temperature applications of "National" Carbon and Graphite are not limited to big-tonnage items. A part of National Carbon's service is to develop *any* application, however small, where the unique properties of carbon and graphite assure a convenience and economy to the user. In the following two instances, a few *pounds* of graphite serve literally *tons* of metal . . . efficiently and at a saving.



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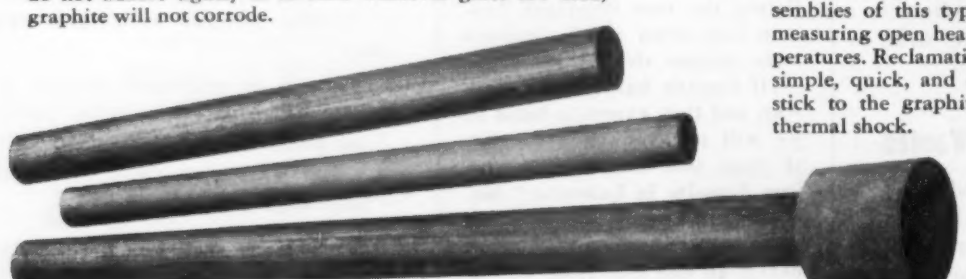
Can't be equalled by any other material for the introduction of purifying gases into molten metal. Graphite won't melt in the bath, can't contaminate the metal. Its low coefficient of expansion prevents cracking and spalling. Metal and dross do not adhere tightly to it. And whatever gases are used, graphite will not corrode.



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Only graphite could provide the degree of low-cost, trouble-free protection required by thermocouple assemblies of this type for the immersion method of measuring open hearth and electric furnace bath temperatures. Reclamation and maintenance for re-use are simple, quick, and economical. Molten metal won't stick to the graphite parts and they're immune to thermal shock.

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Western Steel Stockpiles Shrink

Auto assembly plants, smaller manufacturers worst hit . . . Tonnage boosts for defense producers expected . . . Stocks of most warehouse items at 30-day levels—*By T. M. Rohan.*

Western manufacturers, particularly automotive assembly plants and smaller manufacturers, watched their stockpiles of steel shrink last week.

Some auto plants were shipping parts back and forth in a desperate effort to keep in production. Most run about 10 days to 2 weeks behind Detroit and expected to follow main plants by about that period in any shutdown. Many components purchased from western vendors were in better supply than in Detroit.

The Ford assembly plant at Richmond, Calif., 20 miles east of San Francisco, had announced it was going on a 4-day week. But the plan was rescinded on orders from Detroit due to "government control practices."

Defense Work—Various government agencies were making plans to get steel from producers still operating. No tonnage increases for defense producers has yet been reported. But they are expected momentarily, as the strike continues.

Western subsidiaries of eastern producers had not been approached on partial operation for defense production. They were preparing to release defense priority steel from plants, however.

Warehouses Active—Warehouses at week's end were developing "holes" in their stocks but in general had up to a month's supply for normal business. Some were still receiving shipments from the Midwest and East which had been in transit at the time of the strike.

Principal items in short supply were alloys and heavy flats and rounds not produced locally. Japanese and other foreign steel still went begging due to higher-than-warehouse prices asked.

Northwest Gas Line?—Chances for a natural gas line into the Seattle-Vancouver area from either Alberta or Texas are looking up. The Canadian board of transport commissioners at Ottawa says if sufficient reserves are found in a study of the Alberta fields now under way, it will allow the Westcoast Transmission Co. Ltd., of Calgary, Alta., to build a 960-mile line into Vancouver. The firm hopes to extend this into Seattle. Seattle Gas Co., however, is dickering with the Pacific Northwest Pipeline Co. of Houston and last week gave it a firm letter of intent.

Pacific Northwest plans a $130-million line from New Mexico to Seattle to be completed by summer, 1954. Negotiations are under way for gas reserves of 4 trillion cu ft or 300 million cu ft for 36 years. This company was associated with the $260-million Texas-to-New York and $140-million Texas-to-Illinois pipelines.

INTRODUCING: In case you haven't met him, this is your new West Coast editor, Tom Rohan. Tom is a graduate of Marquette University, and before joining The Iron Age staff was employed by Allis Chalmers Mfg. Co. in Milwaukee.

Aluminum Fabrication—Western Aluminum Corp. of Seattle last week backed up its earlier announcement of plans for installation of a fabrication plant. The firm, which has plants in Portland and Salem, Ore.; Spokane, Wash., and Sacramento, Fresno and Los Angeles, Calif., expects to produce 12 million lb of aluminum products the first year and hit 25 million lb in 5 years.

Announced plans include three rolling mills, foil spooling and trimming machines, dies and punch press, an annealing furnace and machine shop. Principal products will be roofing, gutters and foil.

At Wenatchee, Wash., 150 miles east of Seattle, Aluminum Co. of America started the first of four potlines at its new $50 million plant. Stoppage of building construction due to the steel strike continues.

Los Angeles Industrializes—The Los Angeles Chamber of Commerce last week celebrated Industrial Development Week and trotted out some eye-opening statistics for the occasion. The county ranks third nationally behind New York and Chicago with 12,000 factories.

It leads the nation in six industries, namely aircraft, motion pictures, pumps and compressors, refrigeration, canned sea foods and heating and plumbing equipment. It ranks second in nine others and third in 12 more.

In the last 6 years over $100 million has been invested in 197 new basic metal fabricating plants and 380 expansions.

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Home Market Gets New Copper Price

Now is 29.5¢ per lb, Canadian funds . . . Was 27.5¢ . . . Squawks of producers over double standard is part of reason . . . Bus line boycotted . . . All-Canadian locomotive—*By F. Sanderson.*

Canadian copper sold in the domestic market now enjoys a new price. It is 29.5¢ per lb Canadian funds—as compared with 27.5¢ U. S. funds. Zinc has skidded to 14.80¢ per lb from 15.7¢.

The new Canadian market copper price for domestic producers is the result of price-setting by the government. This was partly motivated by complaints of copper producers against a double standard of prices—a higher world market price and a lower domestic price.

After Chile cancelled its copper deal with America, Canadian producers had visions of getting 35¢ per lb for domestic copper. But Defense Production Minister Howe was reluctant to grant this.

But Not Domestic — Recently copper producers were able to achieve a 9¢ jump in price. Some small sales were made for about 36.5¢ U. S. funds. But this was export business and did not include domestic sales.

Roughly one-half of total copper produced in Canada is sold overseas or in the U. S. and can command around 36.5¢. The remainder is sold in the domestic market. Noranda as well as the asscciated producers dispose of most of their copper in Canada. Hudson Bay Mining sells comparatively little in this market, but enjoys the price benefits of world markets. International Nickel sells about 50 pct in the domestic market and the remainder outside.

Unfair Treatment — Producers selling almost entirely in the Canadian market considered the treatment unfair when they received but 27.5¢ for their product while others selling abroad had the further advantage of some 9¢ per lb. The new price helps a little.

The general feeling in the trade was that the only sensible solution was to let producers sell at the world market price for both domestic and export shipment and forget about Washington policy.

New Pipeline — Saskatoon Pipe Line Co. Ltd., a new company with head office at Regina, Sask., plans construction of a 56-mile pipeline to cost $1 million from Milden to the Hi-Way Refineries Ltd., at Saskatoon.

Pipe will be 6⅝ in. in diameter and will have an initial capacity estimated at 10,000 bbl daily. The proposed line to be in operation by October.

Miners Boycott Bus—Steep Rock Iron Mines, in the Atikokan section of Ontario, was badgered by labor trouble in reverse last week. The mine had to close down for a couple of days because employees decided to boycott the bus company that transported them to and from their jobs.

"My he's so friendly, who was he, Alberta?"

Members of the United Steelworkers' Union of America (CIO-CCL) voted to boycott the bus company when the fares were raised.

Both union leaders and company officials agreed there is no dispute between the union and the mine. James Hill, the union spokesman when asked why workers had not showed up, said it was necessary to have all the car drivers in town to work out pool arrangements. He added arrangements have been made for the transportation of 680 workers. The shut-down cost the mine production of 8500 tons a day.

Home Product—Canadian Locomotive Co., Kingston, Ont., went into production this month on the first Fairbanks-Morse Opposed-Piston Diesel engine.

This means that Canadian Locomotive Co.'s "Consolidation" diesel locomotives in future will be built entirely in the Kingston shops. With electrical equipment supplied by Canadian Westinghouse Co., the Consolidation locomotive is an all-Canadian product.

Recent plant improvements and retooling have expanded and modernized facilities at Kingston. In addition to diesel locomotives, the company builds a wide range of industrial and mining machinery.

Electro-Forge Unit — Massey-Harris Co. Ltd., Toronto, has formed a new manufacturing research and sales unit. It will be known as the electro-forge division and will manufacture and distribute in North America various models of a new and patented forging machine. A new plant with 20,000 sq ft floor space on Curity Ave., East York, has been purchased to house all operations.

This new development came after several years of research into a method of forging by electrical resistance first introduced by Omes Ltd., of London, England.

Lift Ban on Unrated Tool Building

NPA permits tool builders to make machinery for non-defense users . . . But only if rated orders are being sent on schedule . . . Defense delivery requests unrealistic—*By G. Elwers.*

Early in July National Production Authority order M-41 will be amended to permit machine tool builders to make machines for unrated customers. This action will be allowed only in cases where such production will not interfere with defense output.

The Machine Tool Industry Advisory Committee went to Washington to sell NPA on permitting some unrated production. Only a few months ago NPA had expressed itself quite firmly against the idea.

Roles Reversed—But as it turned out, NPA did the selling job. It had a proposed amendment to offer the committee, quite different from what the industry wanted.

Details of the new amendment, which the committee reluctantly agreed to accept, are not yet available. But it is reported to specify that unrated orders can be shipped only if rated orders are being shipped by the builder on required dates.

Unrealistic—At first thought it seems reasonable to specify that a builder must be on schedule with his defense business before he can take on non-defense work. Objection is based on the experience of machine tool builders. They have found required dates for machine tool delivery specified by defense contractors are usually unrealistic.

Theoretically the buyer specifies delivery on the day he will need the machine. In practice, he usually asks for the earliest delivery date he can get. The industry argues it is unfair to require it to meet delivery schedules not based on need.

Didn't Get It — What industry asked for, but didn't get, was a return to the original provisions of M-41, which set aside 70 pct of each builder's output for defense, and left him 30 pct for non-rated customers.

Hardship Clause—Even without the new amendment, M-41 does provide for shipment of non-rated machines in hardship cases. To date, 191 of the nation's 292 machine tool builders, two-thirds of the industry, have applied for permission to ship non-rated machines under the hardship provisions of M-41.

This fact is not so shocking as it might seem at first. Most of these applications only cover one or two individual machines.

The hardship in these cases is on the customer who needs a machine badly but can't get it. It doesn't mean the machine tool builder's business has fallen so badly that he is a hardship case.

"Go ahead and humor him. He's dying to be asked about his vacation."

In fact the formula for determining hardship under M-41 requires such a low business level that the builder would practically have to close before he could apply for relief.

Need the Business — Nevertheless, there are many machine tool builders who do need permission to build non-rated machines to keep their plants going at a high rate of production. Though the average industry backlog is still about 15 months, it is not evenly distributed.

There are many machine tool builders who do not have full production schedules for more than a few months ahead. Relaxation of M-41 will permit them to use non-rated business to keep their plants going full tilt.

Actually permission to accept non-defense business is a defense measure. Washington wants plenty of machine tool building capacity to take care of future defense needs. But where business falls off, workers are laid off, subcontractors are dropped, and capacity shrinks.

Relaxation of M-41's ban on non-rated shipments is, from the Washington viewpoint, a way to keep capacity from contracting due to lack of business.

Priority Extended—The special priority for obtaining steel from warehouses which had been given to machine tool builders has been extended. It was due to expire June 16. But the industry still needs help in getting steel. The right to use the Z-2 priority at the warehouse level has been extended to Dec. 31, 1952.

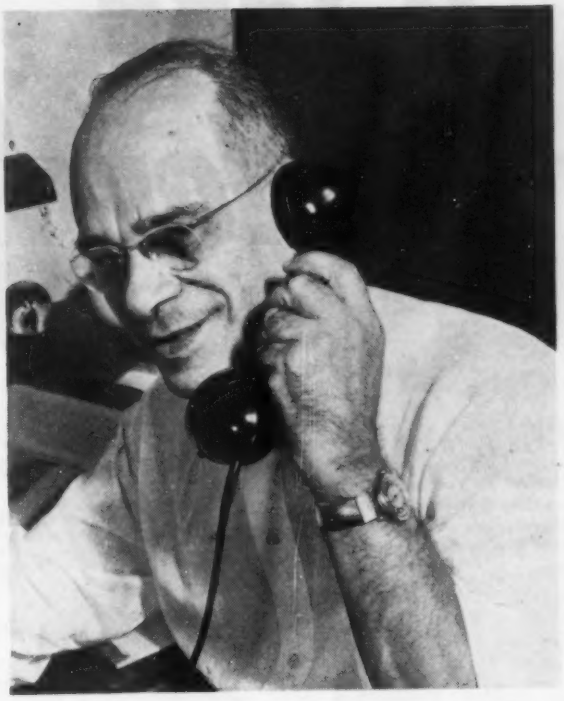
The Search—NPA has launched its Production Equipment Central Inventory Group, reported in this column on June 12. PECIG will search for, list, and allocate government owned machine tools and other production equipment.

The Iron Age

SALUTES

Samuel L. Case

He's blazing tomorrow's trail for industry . . . Hunger for knowledge makes him a top-notch researcher.



TAKE a generous dash of curiosity, a mania for facts, a good sense of humor and a hunger for knowledge and you have a good research man. But you also have a man who can be one of those God-given mixtures of a doer and thinker.

When this fellow has some spare time—as they always do no matter how busy they are—he usually has ideas for patents, ideas for betterment of his industry and a sense that what is good today won't do for tomorrow.

Such a man is Samuel L. Case, technical advisor, Battelle Memorial Institute, Columbus, Ohio. Sam's forte is iron and steel but he gets over into other metals, too. He's impatient with ignorance and his mind runs along like a 100-yd dash winner.

For 18 years he was with Jones & Laughlin Steel Corp. in the metallurgical division and ran the gamut of every job in the department. He finally got to his only love—not to be confused with his full and wholesome family life—research.

Sam pioneered in mangaging sheet steels, work embrittlement tests, protective coatings and free machining steels. He was in on the ground floor with proper sizing of raw materials for the blast furnace and deep research into bessemer steel improvement.

He's written more than 25 technical articles and holds ten U. S. patents, though he wouldn't be the one to tell you about them. With little fuss, he is today blazing new pioneer work for Battelle.

What does it take to *follow through?*

CRACK! Swung with perfect coordination, a clubhead hits a golf ball so hard it flattens it. You see in this A. G. Spalding & Bros. photo the swinging of a golf iron taken at a speed of 1/50,000 of a second.

It takes more than muscle to hit a golf ball the way you should. It takes coordination.

Ask anybody. Everybody will agree, just as everybody agrees you need coordination to run a business. Especially, we think, a steel mill.

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That's why coordination of departments is the No. 1 Rule here at Wisconsin Steel. It's more than just something to pay lip service to. It's our way of life.

It enables us to keep on top of our commitments—to make only promises we can keep, and to follow through on any promises we make. Worth bearing in mind—next time you order steel.

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The Iron Age INTRODUCES

W. A. McKinley, elected president, MIDLAND STEEL PRODUCTS CO., Cleveland, and **L. J. Fralick,** elected vice-president in charge of sales.

George C. Wilder, elected president, and also appointed a director, MACWHYTE CO., Kenosha, Wis.

M. W. Batchelor, appointed president, THE RIVERSIDE METAL CO., Riverside, N. J.

Abe M. Luntz, elected president and treasurer, THE LUNTZ IRON & STEEL CO., Canton, Ohio; and **William Goldsmith,** has been elected executive vice-president and secretary.

Melvin S. Donaldson, elected vice-president in charge of West Coast operations, A. M. CASTLE & CO.

William L. Shank, elected a vice-president, THE INGERSOLL MILLING MACHINE CO., Rockford, Ill.

George C. Ford, made vice-president in charge of manufacturing, NORRIS-THERMADOR CORP., Los Angeles.

John W. Lohnes, appointed vice-president of sales, Jeffers Electronics and Speer Resistor Divisions, SPEER CARBON CO., Pa.

Leroy A. Hughes, appointed to the board of directors, UNIVERSAL DIE CASTING & MFG. CO., Saline, Mich.

Gale E. Allen, appointed supervisor of Trackson products promotion, CATERPILLAR TRACTOR CO., Peoria, Ill.

Floyd S. Laurie, vice-president in charge of manufacturing, and **R. Jamison Williams,** vice-president in charge of development engineering, have been elected to the board of directors, AMERICAN METAL PRODUCTS CO., Detroit.

Robert E. Daniel, appointed secretary and treasurer, TEXAS EASTERN PRODUCTION CORP., Houston; **James W. Burkhart,** named production manager; and **Haden J. Upchurch,** named manager, land department.

John W. Pennington, named executive engineer and head, of the newly-created Technical Dept., Metal Products Div., KOPPERS CO., INC,. Pittsburgh.

Robert B. Bachman, becomes district manager of sales, Boston office, LUKENS STEEL CO.

C. J. Francisco, promoted to newly created post, of manager in charge of Technical Activities, SINCLAIR RESEARCH LABORATORIES, INC., Harvey Research Center.

Ernest E. Kugel, appointed director of sales in charge of rolling mills, HYDROPRESS, INC., New York.

William V. Kershow, appointed technical service manager, WILLYS-OVERLAND MOTORS, INC., Toledo. He succeeds **Dean A. Walters,** who has been named special assistant to the general parts and service manager.

William C. McKenzie, Jr., promoted to senior staff engineer, raw materials division, TENNESSEE COAL & IRON DIV., U. S. Steel in Birmingham; and **Leland H. Johnson,** named to chief engineer of the ore mines and quarries division.

John F. Powers, Jr., joins Newark sales office, CHIKSAN CO.

Howard J. Scaife, named sales manager, HOTPOINT, INC., Chicago; **V. E. Koch,** appointed district manager, San Francisco; **Eugene E. McEwan,** becomes manager of marketing planning.

HOMER F. DONAGHER, appointed vice-president and general sales manager, The Oliver Corp., Chicago.

JOE S. THOMPSON, appointed vice-president, Townsend Co., New Brighton, Pa.

GERALD G. HATCH, appointed director of research and development, Sorel Works, Quebec Iron & Titanium Corp., Montreal, Canada.

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General Electric, 3 phase, 60 cycle
2200 V. 236 RPM. Type MT-30-2000-240
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Personnel

Continued

Robert M. Woodside, appointed branch industrial manager, Cleveland, Industrial Div., MINNEAPOLIS-HONEYWELL REGULATOR CO.; **John O. Paull,** named branch industrial manager, Los Angeles, and **Lee Aplin,** named branch industrial manager, San Francisco.

Herbert K. Holden, appointed salesman, Niagara sales territory, HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y.

E. F. Mechlin, Jr., appointed manager, Washington sales office, CRUCIBLE STEEL CO. OF AMERICA.

Jos. C. Morrison, named manager, Carboloy plant, Edmore, Mich., GENERAL ELECTRIC CO.

W. J. Resiner, appointed manager of stainless steel tubing sales, Steel & Tubes Div., REPUBLIC STEEL CORP., Cleveland.

Charles C. Sigmier, appointed to the board of directors, THE OSBORN MFG. CO., Cleveland.

D. J. Owens, appointed sales manager, THE CLEVELAND CHAIN & MFG. CO., Cleveland.

John B. McCrea, named materials handling sales engineer, PITTSBURGH STEEL PRODUCTS CO., Pittsburgh.

D. G. Clark, appointed assistant general sales manager, FIRTH STERLING INC., Pittsburgh; and **E. William Kalb,** appointed steel sales manager.

S. E. Flenner, Jr., appointed general sales manager, ALLOY PRECISION CASTINGS CO., Cleveland.

Charles A. Carrithers, Jr., named general manager, Hodell Chain Co., division of THE NATIONAL SCREW & MFG. CO., Cleveland; **Maxwell S. Reber,** promoted to assistant general manager, and **David J. Gemmell,** named director of sales.

John R. Boudreau, named abrasive engineer, Dallas, **Robert A. Green,** named abrasive engineer, Detroit, **Russell L. King,** named abrasive engineer, Chicago; and **John R. Mele,** appointed abrasive engineer, Toledo, for the BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

William W. Monahan, appointed manager of industrial relations, Kaiser Engineers Div., HENRY J. KAISER CO., Oakland, Calif.

EUGENE S. PAGE, named special assistant to executive vice-president, American Machine & Foundry Co., New York.

GEORGE W. TESKEY, appointed superintendent, Open Hearth Dept., South San Francisco Plant, Bethlehem Pacific Coast Steel Corp.

L. A. ANDERSON, appointed general superintendent, South San Francisco Plant, Bethlehem Pacific Coast Steel Corp.

ROBERT D. MOSSMAN, appointed an account executive, Bond & Starr, Inc., Pittsburgh.

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Easy to Wire!

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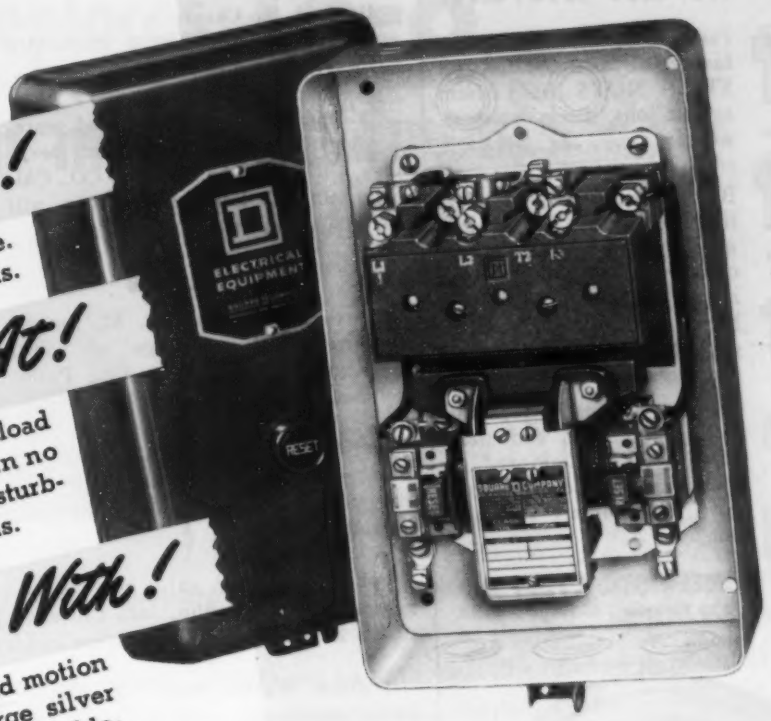

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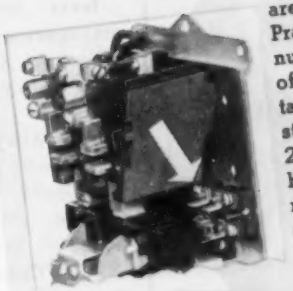

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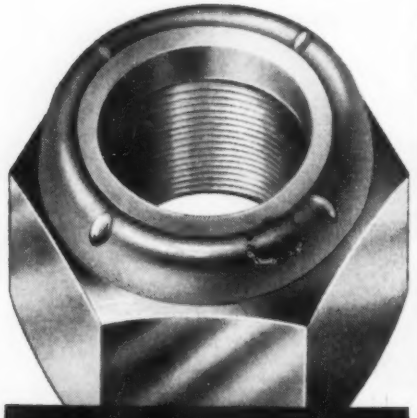


GREER
Stop Nuts

—Personnel—
Continued

R. D. Oldfield, Jr., appointed sales manager, OHIO SCREW PRODUCTS, INC., Elyria, Ohio.

W. W. Alexander, appointed manager of sales, Industrial Trade Products, NORTHWESTERN STEEL & WIRE CO., Sterling, Ill.

Robert C. Conlee, promoted to supervisor of training at TEXAS ENGINEERING & MFG. CO., INC., overhaul division in Greenville, Texas.

Howard H. Casey, appointed general sales manager, THE MIDVALE CO., Nicetown, Philadelphia plant.

William C. Neuenfeld, named representative, Michigan City, Ind., territory, CRIBBEN & SEXTON CO., Chicago; and **C. Edmond Yingling**, will cover Columbus territory.

OBITUARIES

North Emory Bartlett, 82, former vice-president in charge of sales, Pennsylvania Salt Mfg. Co., Philadelphia, at his home.

Arlington E. Stanton, vice-president, American Zinc, Lead & Smelting Co., St. Louis, at St. Anthony's Hospital.

John A. Ladwig, sales representative, Bliss & Laughlin, Inc., Chicago, at his home recently.

William Walton Ford, 65, district sales manager, Atlanta, Ga., The Youngstown Sheet & Tube Co.

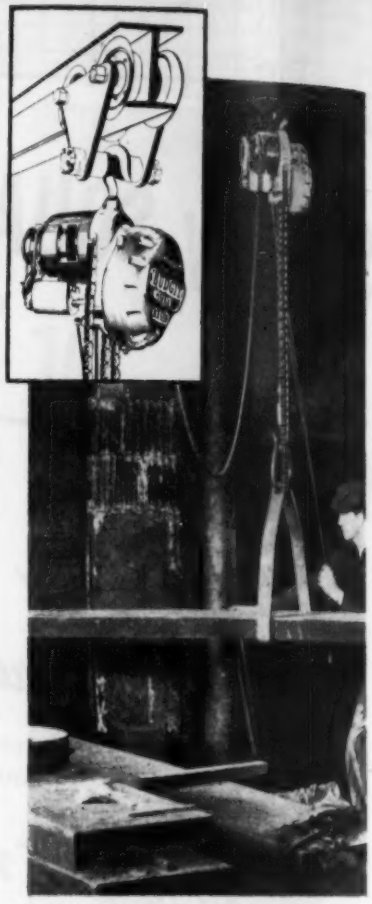
Irvin John Koehnline, 60, sales manager, Metal Decorating Div., Wheeling Steel Corp., Wheeling, at Ohio Valley General Hospital.

John Alwyn MacMillan, 79, director and former president and chairman of the board, The Dayton Rubber Co., Dayton.

C. C. Crubaugh, 64, sales engineer, The Morgan Engineering Co., Alliance, Ohio.

Joseph T. Dempsey, 46, personnel and labor relations director, Philco Corp., radio and television plants in Sandusky, Ohio.

Guy A. Richards, representative in Northern Wisconsin, Michigan and Minnesota, Worden-Allen Co., Milwaukee.



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The Iron Age
FOUNDED 1855
Technical Articles

17 Cr stainless replaces 18-8 in many weldments

Part I

By G. E. Linnert
Research Welding Metallurgist
Armco Steel Corp.
Research Laboratories
Baltimore, Md.

17 Cr steels properly handled show as good corrosion resistance as 18-8 in welded parts. Ferrite grain growth and martensite will reduce joint properties if allowed to form but both can be controlled. The titanium stabilized 17 Cr grade, Type 430 Ti is easier to control when the right welding practice is used. Both 430 and 430 Ti show less distortion in welding than 18-8.

Manufacturers faced with the problem of finding a substitute corrosion resisting material for the copper and nickel containing metals now in short supply have singled out 17 pct chromium stainless steel (AISI type 430) as the most promising. However, the properties of type 430 stainless steel differ sufficiently from those of more familiar grades, austenitic 18-8 stainless steel, to warrant a close study before attempting to use the material in a given application. The welding characteristics and properties of 17 pct Cr steels require perhaps the greatest amount of consideration because welding is often the principal method of assembly. Practical information relating to type 430 and the more recently developed type 430 Ti, it is believed, may enable design engineers and shop men to avoid serious pitfalls in handling these plain-chromium stainless steels.

The plain-chromium stainless steels have been receiving considerable attention because they hold some promise of relief, particularly for 18-8 stainless steel. Among the standard plain-chromium steels which range from a low of about 12 pct Cr to a high of 27 pct as shown in Table I, the 17 pct Cr grade (Type 430) appears to be the most popular. Choice is dictated by many factors, such as cost, corrosion resistance, mechanical properties, suitability for fabricating operations, and so forth. The list of grades in Table I is not complete. The plain-chromium grades not included in Table I are steels developed for special applications which would exclude them from consideration

"Will usually display adequate corrosion resistance under moderately severe conditions . . ."

as practical alternates.

When seeking an alternate for 18-8 stainless steel in a particular application, the lower chromium steels like type 410 with 12 pct Cr probably will not offer sufficient corrosion resistance. Should 12 Cr material be found entirely satisfactory, then the previous use of 18-8 was a case of over-grading. Type 410 is classed as a martensitic grade, which signifies that the material is hardenable. Its hardenability is high enough to present a problem in welding where the base metal heat-affected zones become hardened and consequently suffer loss of ductility. While this problem can be minimized by restricting the carbon content to a low level or by use of the aluminum containing type 405, the corrosion resistance of 12 Cr steels is usually the factor which limits their application.

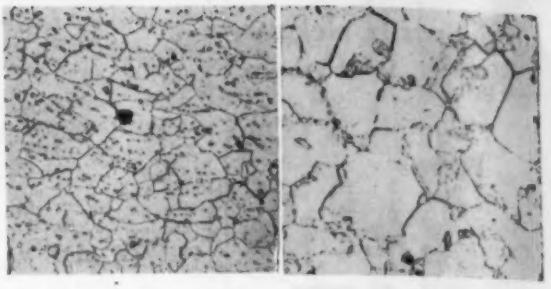
The higher chromium stainless steels like 442 (21 pct Cr) and type 446 (27 pct Cr) are classed as ferritic steels and have somewhat better corrosion resistance than the type 430 steel containing 17 pct Cr. However, no simple relationship exists between chromium content and corrosion resistance, and it cannot be assumed that the resistance of these materials will be commensurate with their chromium content. Generally speaking, 17 Cr steel will usually display adequate corrosion resistance under moderately severe conditions where 18-8 stainless steel has performed satisfactorily. There will be exceptions, and in some cases the 21 Cr or 27 Cr will not serve as well as the 18-8 material. The higher chromium stainless steels, in addition to their greater cost, also present further problems in mill processing and fabrication which tend to limit the consumption of types 442 and 446. Therefore, these grades are not likely to be found in all shapes in warehouse stocks.

TABLE I

COMPOSITION OF PLAIN-CHROMIUM STAINLESS

Common Designation	AISI Type No.	Chemical Composition—% C max.	Mn max.	P max.	S max.	Si max.	Cr	Other Elements
12 Cr	410	0.15	1.00	0.040	0.030	1.00	11.50/13.50	
12 Cr-Al	405	0.08	1.00	0.040	0.030	1.00	11.50/13.50	Al 0.10/0.30
17 Cr	430	0.12	1.00	0.040	0.030	1.00	14.00/18.00	
17 Cr-Ti	430 Ti*	0.10	1.00	0.040	0.030	1.00	16.00/18.00	Ti 5XC min.
21 Cr	442*	0.20	1.50	0.040	0.030	1.00	18.00/23.00	
27 Cr	446	0.35	1.50	0.040	0.030	1.00	23.00/27.00	

* Types 430 Ti and 442 are not presently listed by the AISI as standard stainless steel grades.



A B

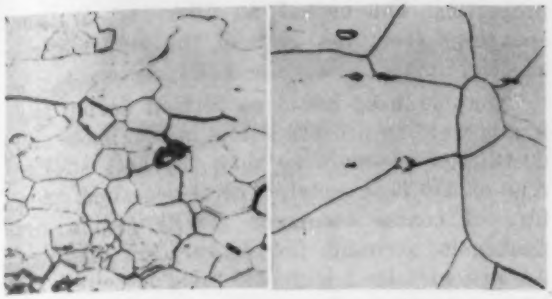
FIG. 1—Microstructure of type 430 (17 Cr) Stainless steel at 250X. (A) Typical annealed structure; (B) Heat-affected zone of metal-arc welded joint showing grain growth and martensite formation.

The majority of type 430 steel is manufactured with a chromium content in the range of 16 to 18 pct and a low carbon content to produce a steel which is *essentially* ferritic. If this material is heated within or above the critical range (lower temperature approximately 1600°F) and cooled, for example as occurs in the narrow heat-affected zones adjacent to a weld, the small amount of hard martensite will form in the matrix of soft ferrite. Ferrite grain size also increases when 430 is heated above approximately 1750°F. These two structural features, ferrite grain growth and martensite formation, are the factors which exert the greatest influence on the properties of a weld joint because both reduce the toughness and ductility of the metal. Figure 1 illustrates the change which takes place in the microstructure of standard 430 when subjected to an arc-welding operation. Reannealing could be used to remove the hard martensite from this structure, but this treatment would not reduce the size of the coarsened ferrite grains.

A relatively small amount of titanium is needed to make 17 Cr steel a *completely* ferritic steel. As indicated in Table I, 430 Ti customarily contains a titanium content of at least five times the carbon content to prevent the formation of any significant amount of austenite upon heating and consequently of martensite upon cooling.

The absence of a structural transformation allows 430 Ti to be utilized in a number of applications. The sudden expansion which accompanies the formation of martensite no longer takes place on cooling and therefore the steel can be used in television cones where glass-to-metal seals are made. Fig 2 illustrates the structure of 430 or 430 Ti before and after welding.

Table II lists mechanical and physical properties for the two grades, and 18-8 prior to welding. The tensile and hardness values are typical for flat rolled, annealed material approximately 0.05 to 0.125 in. in thickness. Impact strength and endurance limit have been



A B

FIG. 2—Microstructure of type 430 Ti (17 Cr + Titanium) Stainless Steel at 250X. (A) Annealed structure; (B) Heat-affected zone of inert-arc welded joint showing grain growth, but no martensite.

TABLE II

TYPICAL PROPERTIES OF CHROMIUM and Chromium-Nickel Stainless Steels in The Annealed Condition

Properties	18-8 Types 302 and 304	17 pct Cr Type 430	17 pct Cr + Ti Type 430 Ti
Tensile Properties:			
Ultimate Tensile Strength, PSI	90,000	75,000	65,000
0.2 pct Yield Strength, PSI	40,000	45,000	45,000
Elongation in 2 in., pct	55	25	30
Hardness, Rockwell B	80	85	80
Izod Impact Strength, V-Notch, Ft.-Lb.	100-120	15-50	
Endurance Limit, PSI	34,000	40,000	
Coefficient of Thermal Expansion, Per Degree F (Mean value 32 to 1000°F)	10.2×10^{-6}	6.3×10^{-6}	6.3×10^{-6}
Thermal Conductivity: BTU/hr/sq. ft/ft/°F at 212°F	9.4	15.2	

determined on bar stock. Typical values have not been established as yet for some of the properties of 430 Ti.

Unfortunately, the transition range for the 17 Cr steels, wherein the manner of breaking under impact at a notch changes from a tough shear type of fracture at the higher temperature to a brittle cleavage type at the lower temperature, lies just above room temperature. The material will be notch sensitive under impact loading at room temperature and below, and will display Izod values of possibly 20 ft-lbs or less. When tested at temperature in the neighborhood of 200 to 250°F, the Izod values will increase to approximately 30 to 50 ft-lbs. Sharper notches and lower temperatures reduce impact resistance.

The characteristic to be kept foremost in mind when planning the design of a welded 17 Cr article is the notch sensitivity of these steels as measured by notched-bar impact testing. The conditions under which this sensitivity will cause difficulty are not easy to predict. Almost any piece of equipment designed to withstand static loading may at some time be subjected to accidental or unforeseen impact loading. Loss of notched-bar impact toughness can be taken as fair warning that the material will not be able to accommodate any appreciable multiaxial stresses even under slow rates of loading. Since stresses of this character are common welding, particularly in heavy sections, avoid notches and points of stress concentration whenever possible.

In designing a welded article the sizes of available material should be considered and an attempt made to relegate weld joints to the least-stressed portions of the weldment. Joint designs which include inherent notches, whether they are internal or external, should be avoided. Corner joints and Tee joints, particularly those made with incomplete penetration, are examples. A simple butt joint made with full penetration represents the most desirable type of joint and can often be arranged through a little planning.

It is good practice to have the bending take place across the rolling direction of the sheet. Bending 430 and 430 Ti parallel to the rolling direction, particularly if the corner radius is sharp, may result in cracking along the corner. By bending corners and locating the joint in a flat section, the butt-joint offers the further advantage of being readily accessible for grinding flush, and, if necessary, X-ray inspection.

In dynamically loaded structures, the design engineer must be on guard to avoid failure through fatigue. The 17 Cr steels are not especially prone to fatigue failure. However, this form of fracture is the most frequently encountered type of mechanical failure in weldments of all grades of steel! Trouble of this nature arises when a designer becomes preoccupied with the convenience and adaptability of joining by welding and ignores the rudiments of good design. A notch or a sharp change in section is usually found to be the underlying cause of premature fatigue fractures. A stress of four or five times the expected value can easily be concentrated at the toe of a fillet weld and in this way exceed the endurance limit of the material. Sometimes a machining operation subsequent to welding can be used as good insurance against stress concentration.

Distortion in 430 and 430 Ti is easier to control than 18-8 material because of certain physical properties. The lower coefficient of thermal expansion of the 17 Cr steels will result in less warpage while subjected to the welding heat. In addition, the higher thermal conductivity will help diffuse the heat from the weld zones. When welded articles must be true to shape and dimensions even the 17 Cr grades should be carefully clamped in sub-

"Distortion in 430 and 430 Ti is easier to control than with 18-8 material . . ."

"430 weld metal should be heat-treated after welding to improve toughness . . ."

TABLE III

TYPE 308 v 430

Typical Properties of Weld Metal Deposited by Metal Arc

Condition	20-10 Type 308 Weld Metal As-Welded	17 Pct Cr Type 430 Weld Metal	
		As-Welded	Annealed 1450°F
Tensile Properties:			
Ultimate Tensile Strength, PSI	90,000	95,000	75,000
0.2 pct Yield Strength, PSI	55,000	ND	50,000
Elongation in 2 in.	40	3	28
Charpy Impact:			
Keyhole Notch, Ft-Lb.	30	1	20

stantial jigs or fixtures. These should be sufficiently rigid to overcome the tendency to warp during welding, and should have enough mass to help dissipate the heat.

There are advantages to preheating for welding which apply to many steels. It may appear quite logical that for 430 and 430 Ti base metal each should be joined by a weld metal of essentially the selfsame composition. This is seldom the case. A fact not widely appreciated is that wrought metal compositions do not often provide good weld metal; and this is particularly true of stainless steels. Bona fide welding rod is made to specially modified analysis requirements to insure good weld metal properties. The use of no filler rod, or thin shearings from the edge of the parent sheet as filler metal, is not the best practice.

Type 430 weld metal as formed during any fusion welding process is low in toughness and ductility, even more so than the heat affected zone of 430 base metal. The as-deposited structure of coarse columnar ferrite grains and martensite accounts for the very low ductility. An article joined with 430 weld metal should be heat-treated after welding to improve the toughness of the weld metal. Despite this rational recommendation, a goodly amount of welded 430 material is placed in service in the as-welded condition. The benefit secured by annealing 430 weld metal can be seen by the comparison of mechanical properties in Table III.

An austenitic Cr-Ni filler metal is frequently used to join 17 Cr steels to secure a ductile weld metal in the as-welded condition. For 430 and 430 Ti, a 308 (20 Cr-10 Ni) covered electrode or a 308 bare rod is generally selected, although almost any austenitic welding material, such as types 309, 310 or 347, can be applied. These Cr-Ni materials will provide a very tough, ductile weld-metal in place of the comparatively brittle 430 weld metal. The use of Cr-Ni weld metal does not prevent grain growth in the base metal heat-affected zones of either grade, nor martensite formation in 430. The bending ability of the weld joint is improved as a result of having highly ductile weld metal present. Despite this advantage of employing Cr-Ni weld metal to join the 17 Cr steels, the austenitic type of weld metal must not be indiscriminately applied. Applications may arise where the difference in color, physical characteristics or mechanical properties of the austenitic weld and ferritic parent metal will cause difficulty. The greater coefficient of thermal expansion of the weld metal is also cause for concern at times.

Table IV contains newly developed data on selected mechanical properties of sheet material corresponding to types 304, 430, and 430 Ti when fusion welded by several processes. Besides covering the most commonly used welding processes, this table also includes data on post-annealed specimens and joints made with austenitic Cr-Ni filler rod. The effect of preheating was not studied in dealing with this relatively light material.

TABLE IV

TENSILE AND BEND TESTS ON WELDED JOINTS

Base Metal Type	Thickness	Welding Process	Filler Metal Type	Condition Before Testing	Tensile Test Results			Guided Bend Test Results	
					Ult. Tens. Str., PSI	Elong., Pct in 2 in.	Location of Fracture	Angle	Location of Fracture
304		(1)	308	AW	85,000	40	BM or WM	180°	.....
430	0.083 in.	Oxy-Acetylene	430	AW	72,400	6.3	HAZ	15°	HAZ
				ANN	68,200	7.0	HAZ	50°	HAZ
		Metal-Arc	E430	AW	76,000	15.6	BM and WM	15°	HAZ
				ANN	73,900	30.0	BM	180°	.....
			E308	AW	76,100	26.3	BM	65°	HAZ
		Inert-Arc	430	AW	74,400	26.6	BM	38°	HAZ
				ANN	72,000	28.4	WM and BM	180°	.....
			308	AW	74,400	23.6	BM	85-180°	HAZ
430 Ti	0.069 in.	Metal-Arc	E308	AW	71,600	25.6	BM	180°	.....
		Inert-Arc	None	AW	70,700	25.0	WM	180°	.....

(1) Values are typical for inert-arc or metal-arc welded 18-8 material approximately 0.05 to 0.125 in. thick.

Explanation of Symbols:

AW—As-welded condition
ANN—Welded and annealed 1450°F—one hour-water quenched
BM—Base metal
WM—Weld metal
HAZ—Heat-affected zone of base metal

Part II of this article will appear in next week's issue of The Iron Age.

Plane Instruments
GET FAST BURN, QUICK FREEZE

New fast cycling, low temperature refrigeration units designed especially for industrial use are capable of reducing the temperature of the test chamber under carefully controlled conditions from +200°F to —80°F in just 1 hr 45 min. If desired, the same carefully controlled cycle can be reversed in 47 min without harming delicate electrical apparatus, tachometers and other precise instruments.

One of the most recent low temperature testing units is shown in the illustration. The unit was built by Industrial Freezer Div., Webber Appliance Co., Indianapolis and is designed for fast cycle, industrial testing at both elevated and low temperatures.

Primary among its many uses as a production line unit, the Webber low-temperature cycling unit is used in the testing of electrical apparatus at both high and low temperatures to simulate quickly and accurately the climatic conditions encountered in actual operation. Full temperature range is down to —165°F and up to +250°F.

Inside dimensions of the test chamber are 36 in. wide, 30 in. deep and 30 in. high. The unit is equipped with a port for observation during the testing. It is capable of temperature cycling from the extreme low to the extreme high and back to the extreme low in unusually short lengths of time. The unit is so designed and engineered it has a marginal factor capable of greater temperatures than required in actual operation.

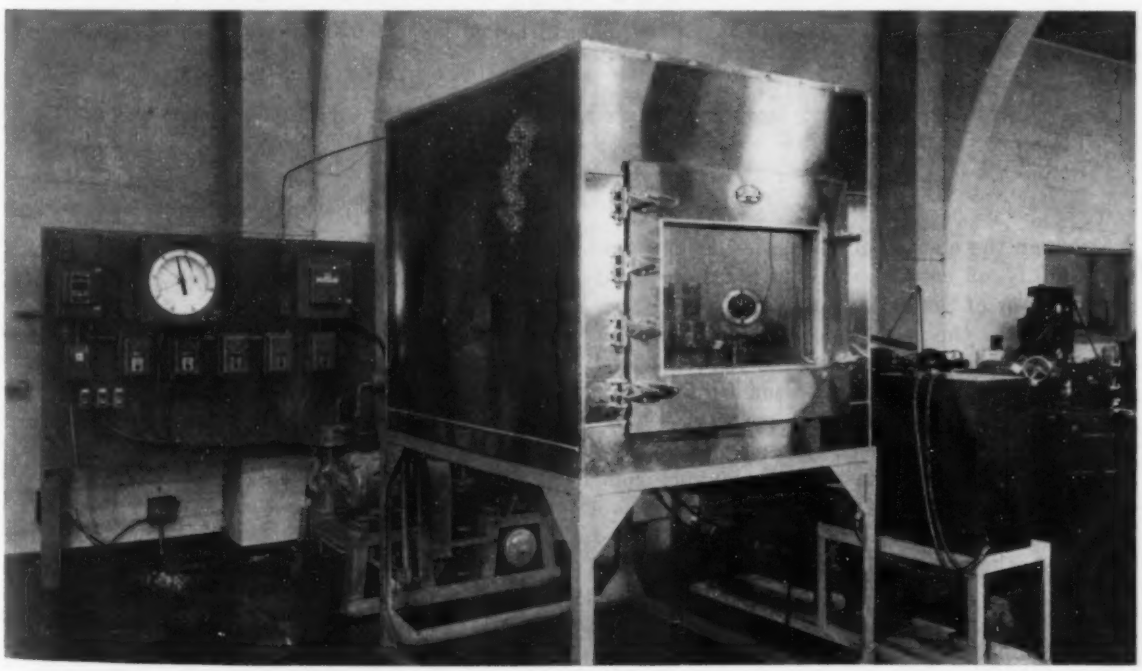
Electrical strip heating elements around the test chamber and adjacent to the cooling coils supply heat.

As a safety feature, at the beginning of the heat cycle, all refrigerant is removed from the coils. The refrigerant cannot return to the coils until the temperature has been reduced sufficiently to remove any danger of the refrigerant coming in contact with extremely warm temperatures.

The unit shown is used by the Eclipse-Pioneer Div., Bendix Aviation Corp., in "Type-Testing" single and dual tachometer-speedometer indicators. The instruments are subjected to temperatures from —65°F and to heat at +160°F to simulate climatic conditions encountered in actual operation.

The control panel to left of the Webber unit records the cycling operation; this is also the control panel which governs cycling operations. The unit to the right records data on equipment under test within the test chamber.

TACHOMETER-SPEEDOMETER indicators undergoing low temperature tests at Eclipse-Pioneer Div., Bendix Aviation Corp. The control panel is shown at the left. Test data for instruments are also automatically recorded.



Air force tests a boron steel—

HOW GOOD IS 80B30?

Temper brittleness, fatigue and low temperature impacts studied

By Lt. R. N. Imhoff USAF
Project Engineer
and

James W. Poynter
Chief, Steel Unit
Materials Lab. Research Div.
Wright Patterson Air Force Base
Dayton, Ohio

One heat of 80B30 has been thoroughly tested in all conditions. Where Charpy impacts of 10 to 20 ft-lb are considered adequate 80B30 can be used except in the normalized condition down to —100°F. At high strength levels 80B30 shows as good impact values as either 4130 or 8630 but in the 125,000 to 150,000 psi strength range the older steels are better. This heat was susceptible to temper brittleness. Analyses fell within established ranges.

Although the method of increasing the hardenability of carbon and low alloy steels by the addition of small amounts of boron is not entirely new, the sudden critical shortage of nickel and molybdenum for use in the low alloys steels has resulted in a tremendous surge of interest in this subject in the past year. Considerable data have been presented covering work done during the past decade by such companies as International Harvester, Caterpillar Tractor, etc., and also recent work accomplished by many other companies. Much of this information has been collected by Division VIII—Boron Steels, of the SAE Iron and Steel Technical Committee under Mr. Harry B. Knowlton, Chairman. These and other data have been summarized and presented in recent periodicals.[1, 2, 3]

Much of this material is concerned with boron-treated carburizing grades of steel which are of great interest and value to the automotive and allied industries. Very little information is available on the susceptibility to temper brittleness, low temperature impact, fatigue and other properties of the boron-treated low alloy steels in the range of 0.30 to 0.45 pct C, which is of vital interest to the aircraft industry. To supply some of these data the Materials Laboratory, Research Division, WADC, U. S. Air Force, initiated a program to evaluate some of the boron-treated

low alloy steels that showed the most promise of being satisfactory substitutes.

On the basis of information available at the time the program was begun; 80B30 was selected as a possible substitute for 4130 and 8630, 81B40 for 4140 and 8740, and 86B45 for 4340. Bars, 1¼ in. diam. were secured from the Republic Steel Corp. While this steel was not produced as aircraft quality steel, it is believed that the results obtained will at least indicate what can be expected from minimum aircraft quality steel. The ladle analysis and the analysis of the bar fell well within the range established by the AISI in the alternate steel list of 13 June 1951. The bar stock was normalized at 1650°F for one hour at temperature and air cooled before using for any subsequent tests.

End quench hardenability specimens were end quenched from 1600 and 1650°F. The hardenability values at 1600 and 1650°F fall within the published AISI bands for 4130H and 8630H steels, Fig. 1. The values are close to the top of the band at distances near the quenched end of the Jominy bar but drop off rapidly beyond ½ in., corresponding approximately to the center of an 1½ in. round quenched in still oil, to near the minimum of the band.

The results of the tensile tests on this material are given in Table I. Since these specimens were heat treated in blanks approximately ¾ in. in diam the values shown can be considered typical of those obtained when bar up to that size is heat treated under comparable conditions. The tensile and yield strengths in the normalized condition are appreciably lower than the values, given as normal expectancy for normalized 1 in. rounds of 4130.

When quenched and tempered to Rc 30 to 32 pct the properties are 136,000 psi tensile, 126,000 psi yield, 20 pct elong. and approximately 60 pct reduction in area. These values compare favorably with the minimum values for steels covered in Military Specifications MIL-S-6758 (4130) and MIL-S-6050 (8630). At this strength level, there is no significant difference between the

FIG. 1
COMPARISON OF HARDENABILITY CURVES FOR 80B30 STEEL WITH HARDENABILITY BANDS FOR 4131OH AND 8630H STEELS

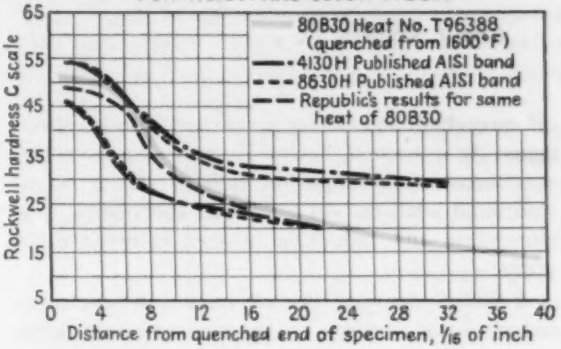


TABLE I
TENSILE PROPERTIES OF 80B30 STEEL HEAT TREATED IN ¾ INCH ROUNDS

Treatment (1)	Specimen No.	Yield Strength 2 pct Offset (psi)	Tensile Strength (psi)	Elongation in 2 in. (percent)	Reduction of Area (percent)	Hardness (Rockwell "C" Scale)
Normalized	A 1	56,000 (2)	87,000	26	57	85 (3)
	2	58,000 (2)	86,000	27	59	87 (3)
	3	57,000 (2)	87,000	27	57	86 (3)
	Av	57,000	87,000	27	57	86 (3)
Oil Quenched	B 1	157,000	218,000	13	50	48
	2	148,000	216,000	13	51	48
	3	150,000	221,000	13	50	51
	Av	152,000	218,000	13	50	49
Water Quenched	C 1	(4)	252,000	14	50	51
	2	176,000	250,000	13	50	51
	3	181,000	252,000	13	50	52
	Av	178,000	251,000	13	50	51
Oil Quenched, Tempered 1 hr, 600°F, Air Cooled	D 1	192,000	212,000	12	54	49
	2	187,000	211,000	12	56	47
	3	195,000	219,000	12	53	49
	Av	191,000	214,000	12	54	48
Oil Quenched, Tempered 1 hr, 1040° Air, Cooled	E 1	127,000	135,000	19	62	32
	2	127,000	137,000	20	61	32
	3	125,000	135,000	20	63	31
	Av	126,000	136,000	20	62	32
Water Quenched, Tempered 1 hr, 1040°F, Air Cooled	F 1	125,000 (2)	135,000	20	62	30
Water Quenched, Tempered 1 hr, 1040°F, Air Cooled	F 2	128,000 (2)	135,000	(5)	62	30
	3	126,000 (2)	135,000	18	61	30
	Av	126,000	135,000	19	62	30
Oil Quenched, Tempered 1 hr, 800°F, Air Cooled	G 1	(4)	175,000	14	57	40
	2	172,000	177,000	13	56	41
	3	169,000	174,000	12	55	42
	Av	170,000	175,000	13	56	41
Oil Quenched, Tempered 1 hr, 1250°F, Air Cooled	H 1	94,000 (2)	108,000	24	70	20
	2	93,000 (2)	108,000	23	70	20
	3	94,000 (2)	108,000	24	70	99 (3)
	Av	94,000	108,000	24	70	20

(1) All Bars Normalized 1 hr at 1650°F. Oil and Water Quenched Bars Austenitized 1 hr at 1625°F.
(2) Exhibited Upper Yield Point.
(3) Rockwell "B" Scale. (4) Gage Failure. (5) Gage Length Not Marked.

Ordinary properties of 80B30 fall within range of other comparable alloy steels . . .

oil quenched and water quenched 80B30 specimens. As quenched, however, the water quenched specimens show superior tensile strengths as compared with the oil quenched specimens. The elongation and reduction in area values are the same.

A 600°F draw of the oil quenched specimens causes little change in the reduction in area, elongation, and hardness results obtained on the quenched specimens but causes an appreciable increase in the yield strength with a lesser decrease in tensile strength. The yield strength obtained by this treatment is the highest obtained by any treatment used in the course of this investigation.

All of these results fall within the bands presented by Patton[4] for the most probable mechanical properties of tempered materials. The observed reductions in area and yield strengths are near the top of the Patton bands while the elongation values are near the bottom of the corresponding band.

Normalized gives low impacts

The notch impact values, as determined by breaking V-notch Charpy specimens at various temperatures, are shown in Fig. 2. Each point represents the average of at least three individual tests. These specimens were heat treated in sizes only slightly larger than the 0.394 in. squares used for the impact specimens. The relatively rapid rates of cooling in these small specimens would tend to minimize any temper brittleness effects and to give more martensite on quenching. The normalized material had the worst low temperature impact properties and the highest transition temperature for any condition of this material tested. Published work[5, 6] indicates that these values do not differ much from those of normalized 4130 or 8630 steels tested at comparable temperatures.

The 600°F draw treatment, which produced such a marked improvement in the yield strength of the oil quenched material, produced a small improvement in the impact strength at room temperature but had no effect at the lower testing temperatures.

For the 800°F tempering, no significant difference in impact properties is noted between the specimens water quenched and those furnace cooled from the tempering temperature. These data suggest that, after tempering 1 hr at this temperature, either the steel is not appreciably susceptible to temper embrittlement or, more probably, the lower limit of the temperature range in which the embrittling phase is thought to form is higher than 800°F. The impact properties of the 800°F draw, which correspond very well with impact properties of an 8630 steel heat treated in a similar manner,[7] are only slightly improved over those of the 600°F draw and the oil quenched treatments. Improvements is most pronounced at the 0°F testing temperature.

1040°F temper gives highest impacts

For the 1040°F draw the room temperature energy values of the water quenched specimens and the 32°F values for both the air cooled and furnace cooled specimens are much lower than the values at the next testing temperature and markedly affect the shape of the impact energy v. testing temperature curves. Considerable scatter is sometimes found between specimens given exactly the same heat treatment. This scatter is present though the Rockwell hardnesses of the specimens are within 0.5 points of each other.

The sharp drop in impact strength of the 1040°F tempered and air or furnace cooled specimens tested at +32°F and of the water quenched specimens tested at room temperature is not explained but sufficient checks have been made to indicate that this drop really exists. If additional water quenched specimens were tested at an elevated temperature (say 200°F) the impact strength would probably exceed 120 ft lb.

These data show that the 1040°F tempering treatment gives the highest impact strengths of any treatment investigated and that water quenching from this tempering temperature gives higher impact at any testing temperature lower than room temperature than air or furnace cooling. This strongly suggests that 80B30 steel is susceptible to temper brittleness in the tempering range around 1000°F.

The impact properties of a 4130 steel drawn to a hardness of approximately Rc 48 are appreciably higher than those of the 80B30 steel at 30 Rc for testing temperatures below 0°F.[5] At the 0° testing temperature, the impact strength of the water quenched specimens of the 80B30 is equal to that of the 4130 (approximately 115 ft-lb). A comparison of data[7] for the impact strength of an 8630 steel at Rc 35 with the 80B30 data at Rc 30 shows the drop in energy values from the maximum level occurs at a higher testing temperature for the 80B30.

It is obvious from Fig. 2 that the impact tests

TABLE II

GOOD FRACTURES v. LOWEST TEMPERATURES

Normalized	above room temperature
Oil quench	+32°F
600°F draw	+32°F
Both 800°F draws	0°F
1040°F draw furnace cool	0°F
1040°F draw air cool	below—1040°F
1040°F draw water quenched	below—1040°F

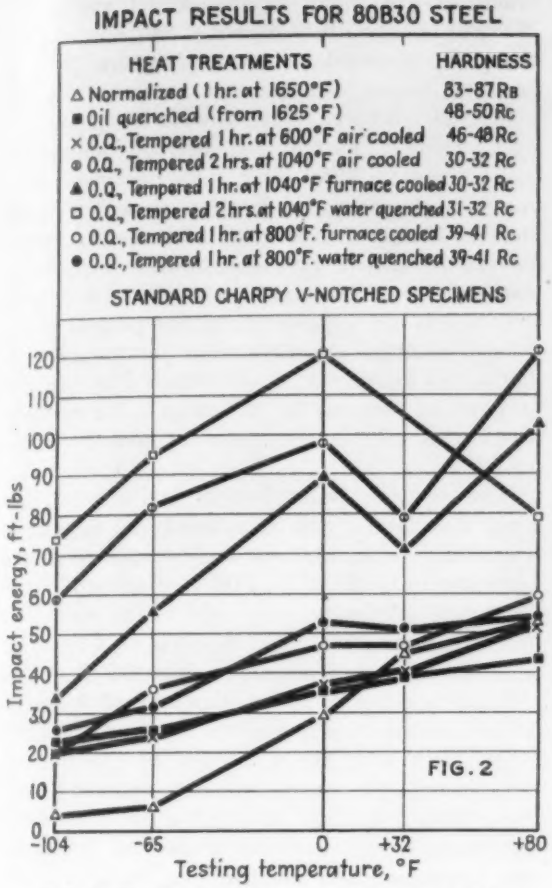


FIG. 2—Results of Charpy impact tests on 80B30.

have not been made over a sufficient temperature range to accurately determine the transition temperatures for the various treatments. However, based on estimations of the lowest testing temperature at which the fracture remains fibrous, the approximations presented in Table II appear reasonable.

Metallographic specimens were etched to detect temper brittleness.[8] The solution was modified slightly by the use of Rodalon instead of Zepheran Chloride as a wetting agent. The specimens were repolished for 1 min after etching. This etchant produces a relatively severe attack on specimens receiving the 800°F draw treatments are relatively unattacked. Only a slight difference in the severity of attack could be detected among the three 1040°F treatments; the furnace cooled specimens appear to be more deeply etched than the others. Attack by the etchant on specimens of an 8630 steel given the 1040°F treatments is considerably less than that on the specimens of 80B30 steel.

The evidence obtained by this technique should not necessarily be considered conclusive since there is doubt as to whether this etchant actually indicates temper brittleness or only coincidentally attacks grain boundaries of steel slowly cooled from the tempering temperature.

A few tensile tests at 170,000 to 180,000 psi strength levels were made on conventional and

TABLE III

CONVENTIONAL AND NOTCHED BAR TENSILE PROPERTIES OF 80B30 AND 8630 STEEL HEAT TREATED IN ¾ INCH ROUNDS

Type Steel	Type Specimen	Treatment	Specimen No.	Yield Strength (psi) 2 pct Offset	Tensile Strength (psi)	Elongation in 2 in (percent)	Reduction of Area (percent)	Hardness Rockwell "C"
80B30	Conv.	Oil Quenched, Tempered 1 hr, 600°F Air Cooled	D1	192,000	212,000	12	54	49
			D2	187,000	211,000	12	56	47
			D3	195,000	219,000	12	53	49
			Av	191,000	214,000	12	54	48
80B30	Conv.	Oil Quenched, Tempered 1 hr, 800°F Air Cooled	G1	(2)	175,000	14	57	40
			G2	172,000	177,000	13	56	41
			G3	169,000	174,000	12	55	42
			Av	170,000	175,000	13	56	41
80B30	Notched	Oil Quenched, Tempered 1 hr, 600°F Air Cooled	DN1	(3)	256,000	1.5	7	48
			DN2	(3)	257,000	1.5	5	48
			DN3	(3)	251,000	3.5	7	48
			Av		255,000	2	6	48
80B30	Notched	Oil Quenched, Tempered 1 hr, 800°F Air Cooled	GN1	202,000	211,000	3	8	41
			GN2	198,000	207,000	2.5	9	41
			GN3	206,000	211,000	2	7	41
			Av	202,000	210,000	2.5	8	41
8630	Conv.	Oil Quenched, Tempered 1 hr, 550°F, Air Cooled	I1	168,000	204,000	10	43	46
			I2	148,000	186,000	12	49	47
			I3	183,000	217,000	9	40	46
			Av	166,000	202,000	40	44	46
8630	Conv.	Oil Quenched, Tempered 1 hr, 800°F, Air Cooled	J1	168,000	184,000	12	50	42
			J2	163,000	182,000	11	49	42
			J3	129,000	158,000	14	41	42
			Av	153,000	174,000	12	47	42
8630	Notched	Oil Quenched, Tempered 1 hr, 550°F, Air Cooled	IN1	(3)	215,000	2	4	44
			IN2	(3)	245,000	2	3	46
			IN3	(3)	242,000	2	3	49
			Av		234,000	2	3	46
8630	Notched	Oil Quenched, Tempered 1 hr, 800°F, Air Cooled	JN1	189,000	208,000	3	7	43
			JN2	(3)	185,000	5	13	40
			JN3	(3)	214,000	3	8	42
			Av	189,000	202,000	4	9	42

(1) 80B30 Bar Stock Normalized 1 hr at 1650°F. Specimens Austenitized 1 hr at 1625°F before Quenching.
8630 Bar Stock Normalized 1 hr at 1650°F. Specimens Austenitized 1 hr at 1575°F before Quenching.
(2) Gage Failure.
(3) No Curves Recorded.

Notch strength ratio and rotating fatigue strengths of 80B30 are as good as former steels . . .

notched bar specimens of 80B30 and 8630 to determine the relative tendencies toward embrittlement in the presence of stress raisers, Table III. The notched tensile specimens were threaded and had a gage length of 2 in., a diam of 0.555 in. and a notch of 0.025 in. deep. The notch had an included angle of 60° and a 0.010 in. radius at the bottom and was machined midway in the gage length.

The amount of scatter in test results for both conventional and notched specimens is less for the 80B30 steel than that for the 8630. The data indicate that at the higher strength level the notch ductility of the 80B30 steel is greater than that of the 8630 steel, 6 pct v. 3 pct, whereas there is little difference in notch ductility between the two steels at the lower strength level, 8 pct v. 9 pct. The notch ductility of the 80B30 steel decreases less with the increase in strength level.

The ratio of notch strength to regulate tensile strength for the 80B30 and 8630 steels at the two strength levels show little difference in the effect of strength level on the notch strength ratios of the steels and the notch strength ratios 1.16 to 1.20 are practically the same for both steels.

Steel	*Strength Level psi*	*Notch Strength Ratio*
80B30	200,000 to 220,000	1.19
"	170,000 to 180,000	1.20
8630	200,000 to 220,000	1.16
"	170,000 to 180,000	1.16

It is claimed [9] that notch ductility varies with both strength level and notch radius, the ductility being smaller in general for smaller radii and higher strength levels, and that notch strength values which are consistant and above the ultimate strength are associated with relatively high notch ductility. The results of these tests conform to these statements.

The appearance of the fractured surfaces of the conventional tensile and impact specimens of the 80B30 steel is of considerable interest. The normalized only, water quench only, oil quench only and quenched and drawn at 600°F tensile specimens show the conventional cup and cone fracture generally observed. All of the 800, 1040 and 1250°F draw specimens show fractures that can be designated as star or split; the star type apparently representing a transition stage between the usual cup and cone type and the split type. In some cases cracks at the fracture longitudinal to the axis of the specimen develop in the split type of fracture.

Similar differences in the appearance of the fractures are found in the impact specimens. Many of the specimens drawn at 800°F or 1040°F show the so-called split type fracture, Fig. 3. In some cases, the fracture surfaces show a step type fracture. When a wide scatter in impact strength is obtained between specimens given the same processing, those specimens having a high energy absorption show the usual ductile fibrous fracture while those specimens having lower energy absorption show the split type fracture. The significance of the split type fracture is not apparent from the present work. These fractures appear similar in character to, but not as extreme as, those obtained by Lea and Arnold, as reported by Holloman [10] for severely embrittled tensile specimens of nickel chrome steel.

The rotating beam fatigue strength of this steel was determined on notched and unnotched specimens as normalized and as quenched and tempered to Rc 29 to 31, Fig. 4. Standard 3 7/16 in. length specimens were used in the tests. The unnotched specimens had a radius of 5 in. with a smaller section diameter of 0.290 in. The notched specimens had a diameter of 0.340 in. with a 0.025 in. deep notch of a 60° included angle with a 0.010 in. radius at the bottom. The normalized unnotched and notched specimens have endurance limits of 45,000 and 23,000 psi respectively, and the endurance limits of the unnotched and notched heat treated specimens are 76,000 and 32,000 psi, respectively. Strength reduction ratios for the normalized and heat treated conditions are 1.9 and 2.4.

Hardenability alone overrated

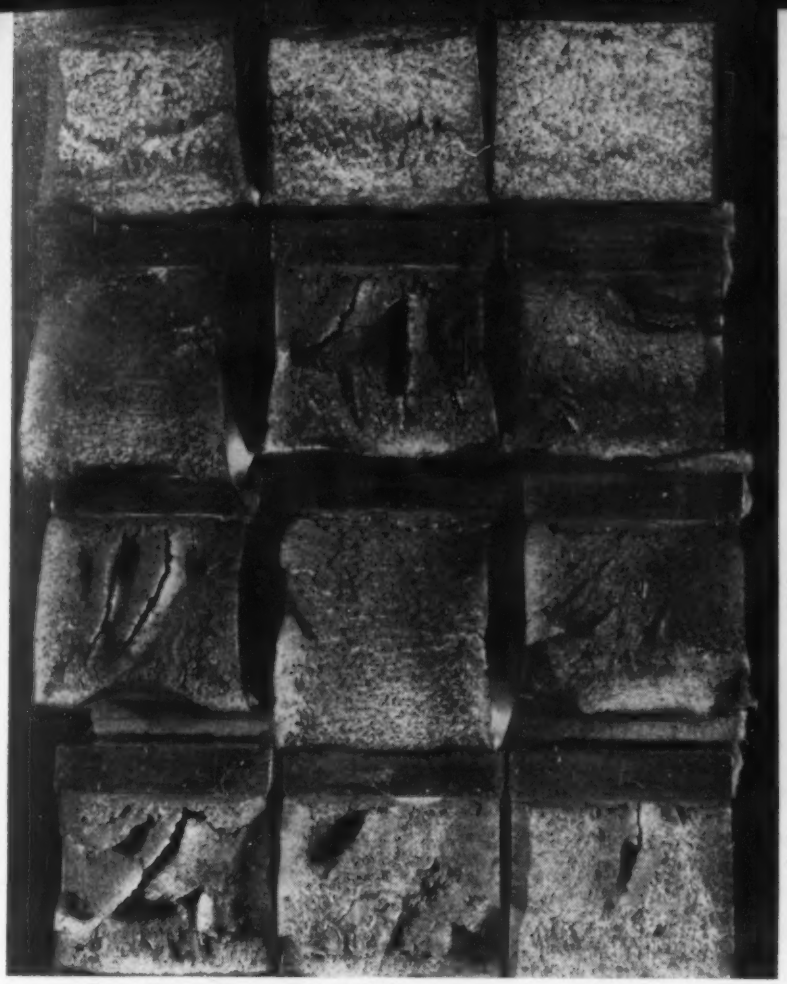
The results follow the recognized trend exhibited by fatigue data of the low alloy steels in general, i.e., endurance limits fall well within bands representing the usual endurance limit expectancy for notched and unnotched carbon and alloy steels.[11]

It must be emphasized that similarity in Jominy end quench hardenability curves is not necessarily the only requirement for one steel to be an adequate substitute for another. Recent work [12, 13] has shown that the end quench test has definite limitations and that two steels cannot always be used interchangeably to produce a part, even though the end quench curves of the two are identical.

Whether the impact strength found is adequate is a question to be decided by the designers for the particular application, not the metallurgist. When impact values of 10 to 20 ft-lb are considered adequate, this heat of 80B30 could be used, except in the normalized condition, at temperatures down to −100°F.

Acknowledgment

The cooperation of Mr. D. H. Ruhnke and Mr. E. S. Bower of the Republic Steel Company in making this material available and in supplying some data and of the personnel of the Materials Laboratory, Research Division, Wright Air Development Center, on the test program is gratefully acknowledged.



Heat Treatments.

Normalized (1 hr at 1650°F.)

Oil quenched, tempered 1 hr at 1040°F., furnace cooled.

Oil quenched, tempered 2 hrs at 1040°F., water quenched.

Oil quenched, tempered 1 hr at 800°F., furnace cooled.

Room temp. 0°F 104°F

FIG. 3—Effect of heat treatment on type of fracture found in impact specimens of 80B30 steel.

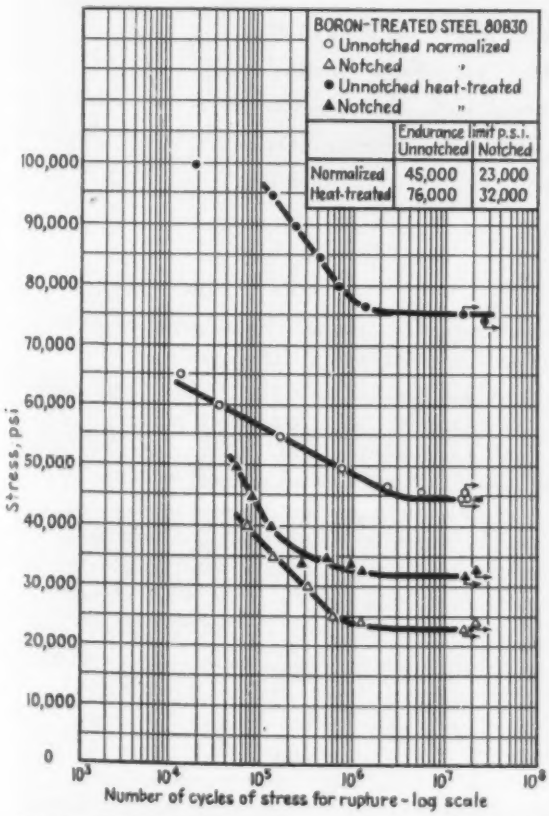


FIG. 4—Rotating beam fatigue tests on 80B30 in both normalized and quench and tempered conditions.

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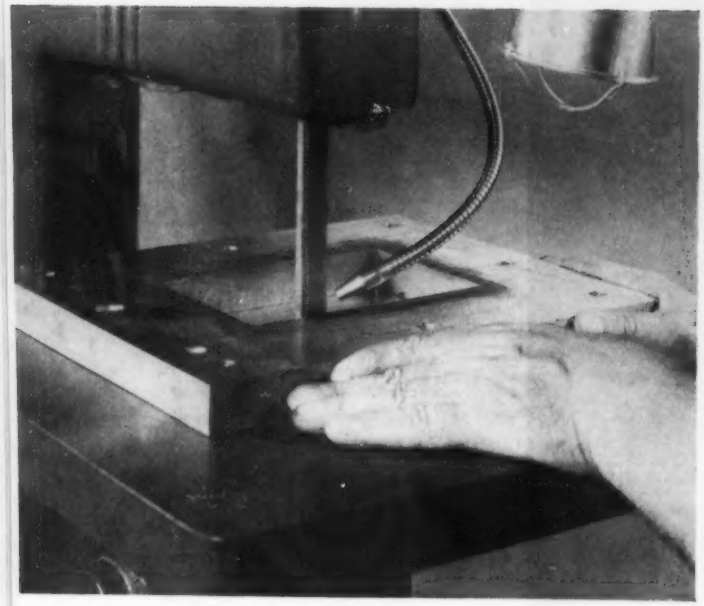
No unproductive motion—



FILING a die opening with a ½-in. 20-tooth, bastard medium cut file band. Velocity on this job is 50 fpm. Excess material is removed at a rate of 3 oz per hr.

CONTINUOUS FILING IS ECONOMICAL

By H. J. Chamberland
Research Engineer
The DoAll Co.
Des Plaines, Ill.

Continuous filing is at least 9 times faster than hand filing, 3 times faster than jig filing, and more accurate than either. It often replaces heavier equipment in stock removal work. Operators need minium training. Short-angle files give high metal removal rates on materials other than steel. Heavier equipment is relieved for other jobs.

Continuous filing, or band filing, is a source of economy many plants overlook. It is 9 times faster than hand filing, and at least 3 times faster than jig filing. And it is more accurate than either.

Both hand and jig files are reciprocal movement tools. If the operator could file 8 hrs consecutively he would actually be producing during only 4 hrs. The expert hand filer has control over the return stroke and thus obtains normal life from his files. Whereas, the jig filer has to combine up and down strokes and hence there is extremely short tool life unless the amount of material to be removed is kept at a minimum.

The second economy factor of the band filing method is that, contrary to hand and jig filing, it requires only limited training on the part of the operator. Particularly, women usually master the technique within a week, thus releasing skilled men for other and more complicated work not within the range of the process.

Absolute control over the proper filing speed for each application minimizes the heat generating problem considerably. The operator soon realizes that regardless of the cut or shape of file being used, high cutting rates result from the correct speed rather than excessive work feeding pressure. Although pressure can be exerted to the point of stalling the band with no serious effects; one should not take advantage of this.

Band filing can relieve heavier equipment and thereby help to reduce manufacturing costs. A band filer is one of the lowest operating cost units in any plant today. There are various types of considerably heavier conventional machines which it can often replace most economically. The correct file band is now accepted as a stock-hogging tool and should be given every

opportunity to prove its value in this respect.

The short angle file, particularly developed for cast iron, non-ferrous metals, light metals and non-metallic materials, is the most productive of all files of the continuous cutting type. Because of its long knife-like teeth which are practically non-clogging, this file will stand a maximum of feeding pressure while generating a minimum amount of heat. Therefore, a considerable number of operations formerly executed in a milling machine, shaper and even grinding machine are now diverted to the band filer. While the coarse-teeth bastard cut files remain first choice to expedite filing steel, the short angle file is given the preference on other metals.

If the operation requires a particular type of finish, the short angle file is used to remove the bulk of the material and the proper bastard file according to finish desired completes the job. The changeover takes but a few minutes' time.

The following, a typical tool life test, was to determine the amount of metal a 16-tooth bastard cut file could remove in 50 hr of continuous cutting on a commonly used type of tool steel and thereby obtain a dependable estimate of tool life. The operation consisted of repeated plunge cuts of 4 lineal inches, using a pulley-type mechanical feed to obtain a constant feeding pressure. The filings were removed from the table at the end of each cut and the results were tabulated after the 50-hr test period.

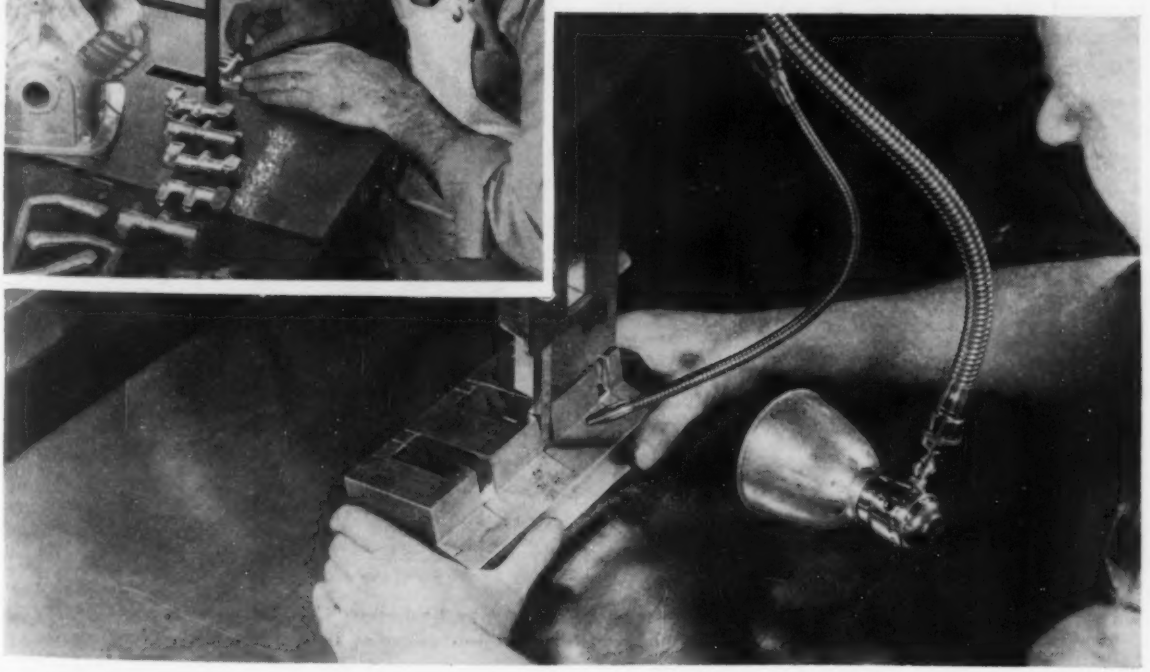
The material was 1-in. oil hardening steel of 75 to 77 hardness measured on the 15N scale of the Rockwell superficial tester. The file was a $\frac{3}{8}$-in. 16-tooth flat bastard used on a 75-in. band filer at 100 fpm and a feeding pressure of 12.5 lb.

It was found that 39.88 cu in. of material had been removed, representing a total weight of 11.3 lb. This is equivalent to cutting a 107-in. slot $\frac{3}{8}$-in. wide in 1-in. thick material. No loading of the teeth occurred during the test and a close inspection of the file band showed that it had lost only 30 pct of its original cutting efficiency. With a $\frac{1}{3}$-in. 12-tooth file, the volume of chips would have been increased by at least 40 pct but with a coarser finish.

In recent months it appears that some plants are for some reason or other not getting normal life from some of their file bands. They have made inquiries as to the merits of recutting the teeth of such tools. Unfortunately, repeated laboratory tests prove that the performance of reconditioned bands is extremely low and therefore this practice is definitely not practical as applied to file bands. Tests show that a recut band has a definite tendency to pull the material sideways while cutting. There is hung-up condition which pulls the band off the carrier wheels. And, the wider the band and coarser the cut, the worse its filability.

SHAPE and accuracy of these zinc alloy die castings made a trimmer die impractical. They formerly required 1½ min for hand filing. Band filing takes only ⅓ as much time.

INTERNALLY band sawing and band filing these parts, produced on a short run basis, saved a $1000 broach investment.



Do trucks jam your platforms?—

Conveyer-lowerator cuts unloading time 66 pct

A new lowerator, for moving tinplate to basement storage at the Baltimore plant of Continental Can Co., cuts over-the-road truck unloading time 66 pct. It also eliminates a 140-ft fork truck haul, enables one ground floor fork truck to do the work formerly done by two, frees an elevator, and eliminates congestion.

Formerly, two fork trucks carried incoming tinplate a distance of 140 ft to an elevator. The elevator could carry but two bundles at a time—not enough to keep up with the fork trucks—and consequently tinplate had to be stored temporarily near the elevator entrance. Distance plus congestion slowed operations to the point where it took half an hour to unload an over-the-road truck.

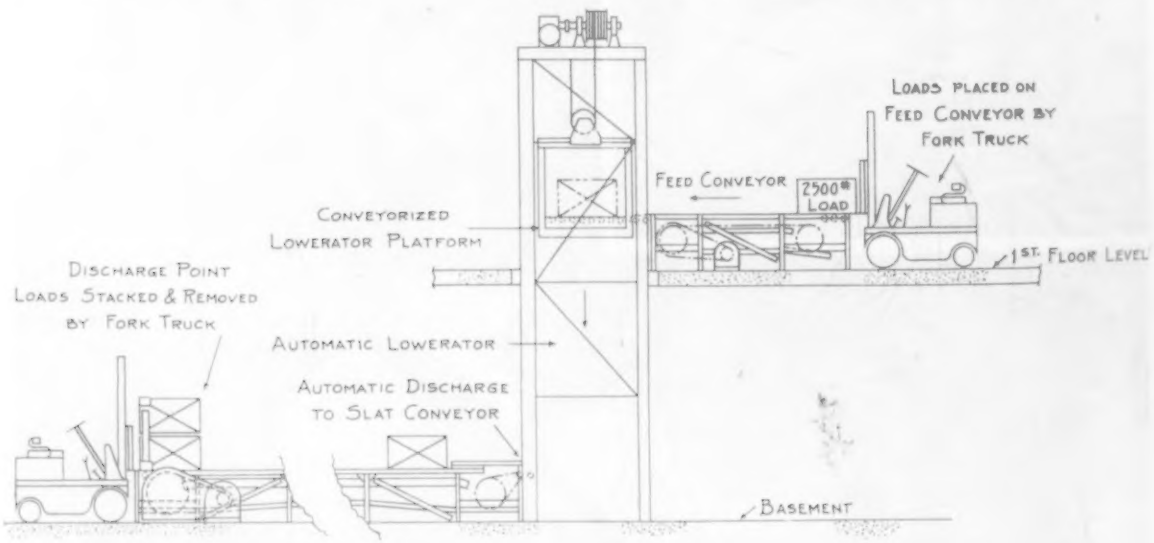
To solve the problem, an automatic lowerator (see sketch) was installed between the first floor and basement. The custom built system was engineered, manufactured, and installed by Gifford-Wood Co., Hudson, N. Y.

The lowerator was installed near the unloading platform to eliminate the long fork truck hauls and now only one fork truck is required for unloading. In addition, only 10 min are needed to unload an over-the-road truck—a time saving of 66 pct.

Bundles of tinplate are removed from over-the-road trucks by a fork truck and placed on the first floor conveyer. This "feeder" conveyer carries the bundles to the lowerator which carries them down to the basement conveyer. The basement conveyer takes them to a discharge point where they are picked up by fork truck and taken to storage.

Except at the beginning and ending of unloading operations, the handling system is operated as bundles break and make electric-eye beams. During these two periods, however, there are not enough bundles on the system to operate the electric eyes. Therefore, an auxiliary eye beam is installed at the discharge end of the basement conveyer to operate the system when starting up or shutting down. This beam is broken by raising the forks of the fork truck.

During normal operations, the key to the operation of the fully automatic Gifford-Wood system is a conveyer-high eye beam at the discharge end of the basement conveyer. This eye stops and starts the system to move up



SCHEMATIC DIAGRAM shows Gifford-Wood conveyer system used by Continental Can, Baltimore, to move tinplate from trucks to storage. Installed near loading platform, lowerator cuts unloading time of big trucks to 10 minutes.

An ingenious combination of an electric lowerator with a conveyer system handles tinplate bundles in a third the time required when incoming material was unloaded by fork trucks and moved to an elevator. The new setup in a canmaking plant operates automatically as bundles interrupt the electric eye.

new bundles to replace those taken to storage. As a bundle is removed from the conveyer by the fork truck, the electric eye beam makes contact and starts the entire system in motion. The following steps automatically take place:

(1) The basement conveyer brings the next bundle to the discharge point and stops when the bundle breaks the electric-eye beam.

(2) While this is taking place, the lowerator discharges its present bundle to the basement conveyer and returns to the first floor for another bundle.

(3) A bundle is fed to the lowerator by the first floor conveyer. Bundle automatically stops in the center of the lowerator "tray."

(4) The lowerator returns to the basement.

(5) The fork truck operator on the first floor places another bundle on the first floor conveyer.

(6) The first floor conveyer moves the next bundle to the shaft and an electric eye stops it at this point. A limit switch is also installed should the electric eye fail.

Each movement of the bundles is controlled by an electric eye and limit switch so that each conveying unit will not move the load unless the next conveying unit is ready to receive it.

FORK TRUCK takes tinplate bundle from street truck to slat conveyer which feeds lowerator (background). Electric eye stops bundle at shaft opening. Lowerator moves one bundle at a time to another conveyor in basement.

The basement fork truck takes two bundles to storage at a time. It removes one bundle and sets it on top of the next bundle as it moves into place. Then it lifts both bundles and transports them to storage.

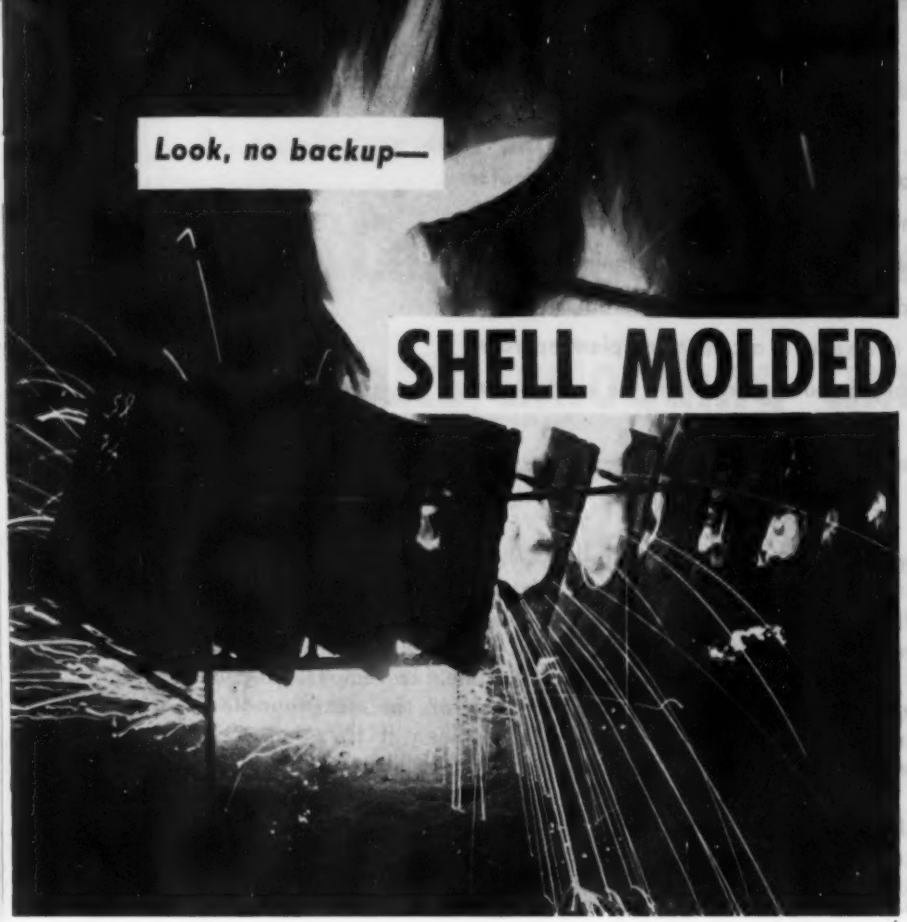
One fork truck on the first floor can keep two basement fork trucks busy even though the latter carry two bundles at a time. This is because the basement trucks make long hauls whereas the ground-floor truck operates within a few truck lengths.

The platform of the lowerator is made of a section of live-roll conveyer. This live-roll platform is raised and lowered by a 7½-hp hoist. The basement conveyer is at right angles to the first floor conveyer so the tray of the lowerator is rotated 90° while descending or ascending. This is done by guides along the walls.

The horizontal conveyers are of the slat type to support the heavy loads. Slats are formed by bolting the ends of channel sections to two parallel roller chains in such a way that the channel-sides form a flat conveying surface. The roller chains are supported by structural members. The first floor conveyer is driven by a 2-hp motor and the basement conveyer by a 7½-hp unit. Both of these drives and the lowerator shaftway are protected by guards.

Over-the-road trucks bring the tinplate to the plant from nearby steel mills. Each truck carries sixteen bundles weighing from 2000 to 3000 lb apiece. Trucks leave the steel mills at staggered intervals so that one arrives at the Continental Can plant every few minutes. Schedules are determined a day ahead so necessary unloading and storage plans can be made. Two unloading docks are provided.

Hydraulically controlled toe plates bridge the gap between the unloading dock and the truck tail gates. The toe plates automatically adjust to compensate for differences in height between truck and dock as the truck is unloaded. Under the old system, manually handled non-adjusting toe plates materially cut the life of fork-truck tires.



SHELL MOLDED Stainless Valves and Fittings Now in Production

By G. F. Sullivan
Managing Editor

An increase in metal yield of 20 to 35 pct plus better tolerance, smoother finish, no cleaning problems and cleaner working conditions are paying off at The Cooper Alloy Foundry. No back-up or support is used in pouring off any shell molds made to date. All production has been either 304 or 316 type stainless steels. Standard green sand cores are used with the resin bonded sand shell molds.

The use of shell molding for stainless steel castings is being pioneered by The Cooper Alloy Foundry Co., Hillside, N. J. All of their output to date have been valves or fittings but the company has under development the production of other types of castings. Laboratory research was started at Hillside in Aug. 1950. In Dec. of 1951 a large automatic single stage molding machine was installed and regular foundry production began early this year.

The advantages of shell molding over green sand practice have been previously recorded in these pages. In addition to the ordinary savings in sand, labor and time experienced by any foundry using shell molding, the increase in metal yield into saleable castings is much more significant at Cooper because of the comparatively expensive steel grades used.

Most of the valves or fittings are cast of type 304 or 316 stainless. Metal yield by shell molding has been increased by 20 to 35 pct over the regular green sand practice at Cooper Alloy. This in turn means faster production of more castings per ton of metal melted and poured. Less scrap is therefore generated which in a way conserves alloying elements such as nickel and chromium but faster production still represents the major savings as the scrap can be remelted.

The usual improvement in the cast surfaces through shell molding has cut cleaning time of

such castings to a minimum and has given a better looking product of much closer tolerances. Working conditions, always a drawback in even the best operated foundries are vastly improved because of less dirt and dust. Shell molds weigh only about 1/10 as much as sand molds which is another big plus on the labor side. Also the shells are hard, not fragile like sand molds, so that storage and handling are easier and safer. Less floor space for the same output is another factor inherent to the shell process.

Cooper-Alloy has taken advantage of these savings and is currently converting more of their regular products to shell molding. So far they have successfully shell molded valve bodies, bonnets and fittings such as ells, tees, etc. As cast weights of these parts run from 1 to 25 lb and are all poured into shells which are not supported or backed up in any manner. By eliminating backup materials, like shot and sand, they have further added to the simplicity and cleanliness of the process.

One of the main reasons for using shells instead of conventional sand molds by the industry has been the great savings often secured by decreasing subsequent machining operations. In Cooper Alloy's regular products this is not an important factor. Nevertheless the process is paying off in other ways. Castings exceedingly difficult to make in green sand have been easily made by shell molding which has relieved the regular foundry of a lot of production headaches. Then too, sand castings are often susceptible to shifts in the mold which may cause as high as 40 pct rejects even under optimum operating conditions and most careful founding methods. In shell molding at Hillside shifts are never experienced and such rejects have thus been eliminated.

Iron oxide used in sand mix

Cooper Alloy uses the regular type resins in an 8 pct resin, 87 pct, 160 AFS fineness, sand mix. The balance of the mix, 5 pct, consists of —200 mesh iron oxide which Cooper has found improves the surface of the castings. Oil banded sand cores, washed in a mixture of zircon flour, Bentonite and alcohol, are employed with the shells.

Before any part is put in production the shell molding laboratory works out the best molding practice and pattern design for each application. Once the fundamental problems are solved the pattern plate is run in on the laboratory equipment where a complete molding cycle takes 8 min once the pattern reaches the proper temperature. Castings made from these shells are carefully checked for soundness, tolerances, surface finish and size before the pattern is transferred to the production machine.

The single stage automatic molding machine shown in Fig. 1 is designed to make one shell

SHELL MOLD MACHINE CYCLE

Sequence of Operations

1. Preheat of pattern plate to 500°F.
2. Lowering dump box onto pattern.
3. Louvers in dump box open, sand-resin mix falls on pattern.
4. Complete unit rolled over, excess sand-resin mix falling back into dump box.
5. Louvers closed and unit rotated to normal position.
6. Dump box raised leaving soft shell mold on pattern.
7. Oven rides out over mold.
8. Mold cured at 500°F. (pattern temperature)
9. Oven retracts after cure.
10. Ejector pins raise hardened mold from pattern.
11. Mold removed from machine.

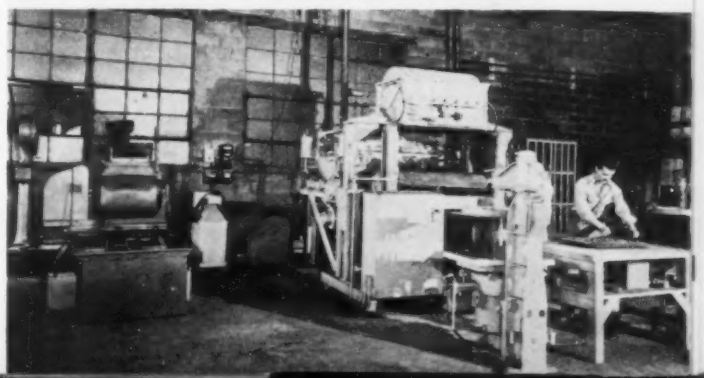
every 2½ min. The platen on this machine measures 45 x 30 in. which will produce a single shell mold as large as 41 x 26 in. Cooper Alloy very often designs their patterns, as shown in Fig. 2, so that two identical shells are made per machine cycle.

The hopper on top the machine holds 350 lb of resin sand mix and is replenished with a 200 lb addition as shown in Fig. 3 after every 15 or 20 shells are made. The machine is actuated by air, controlled electrically and can be operated in either semi or fully automatic manner.

A bimetal pattern plate is used. The bottom plate is 2 in. thick made of gray iron to which the aluminum patterns and gatings are mounted. A thermocouple embedded in the iron plate records the pattern temperature. The temperature recorder is tied into the operating cycle of the machine to insure optimum operating conditions. The full sequence of operations shown in the box are repeated automatically but can be interrupted in any stage by buttons on the control panel.

After the mix is dumped on the plate, see Fig. 4, and the hopper returns to its original position the natural gas fired oven rides forward over the molding mix. The curing temperature of 500°F is used and curing takes 10 to 30 sec at which time the oven automatically retracts and the air driven ejector pins raise the hardened

FIG. 1—Shell molding equipment shown above consists of a sand resin mixer and scales left, and the molding machine, center. The two squeeze presses for bonding the shells are shown on either side of the operator.



Divided pattern plate makes one complete shell mold for every machine cycle.

FIG. 2 — Divided pattern plate produces two matching shells per machine cycle. The hood of the baking oven can be seen in the background. The capacity of shell production on the machine is about 300 molds per 8 hr.

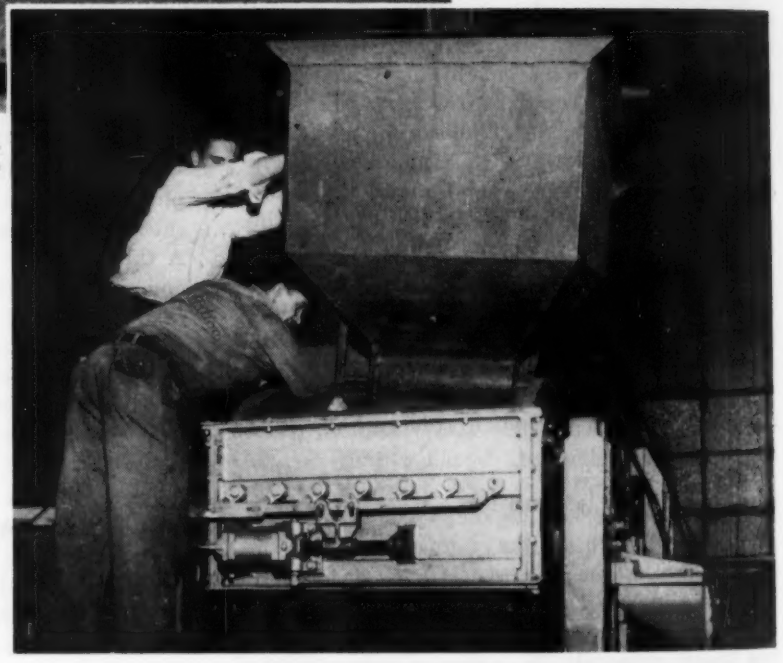


FIG. 3—Molding mix being added to the hopper of the molding machine. The entire hopper and plate assembly rolls over after mix is dumped onto the pattern.

FIG. 4—Machine going through the roll over cycle. Air actuated cylinder and drive arm to the louvers can be seen mounted on the side of the hopper.

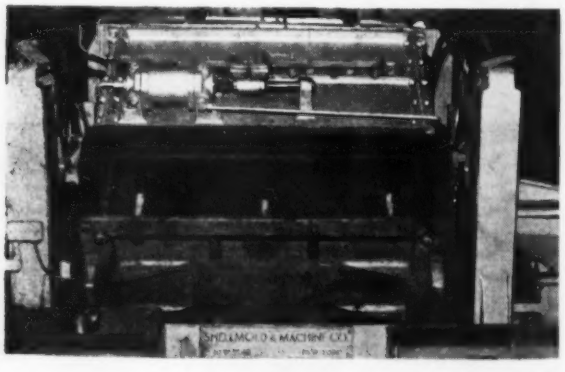


FIG. 5—Cured shells are raised from pattern by ejector pins. These pins marked with arrows bear on the mating surfaces of the shells at points in which the shell is square and flat to the pattern plate.

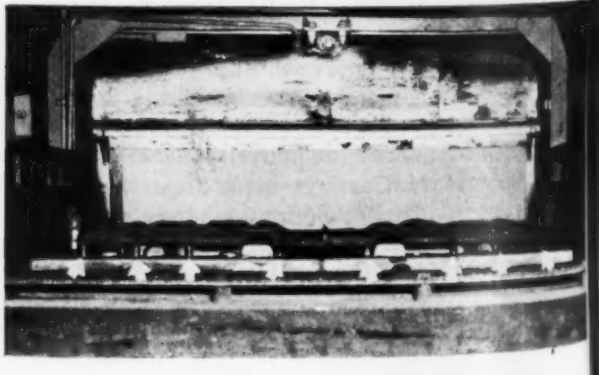


FIG. 6—Half of the complete still hot mold is removed from the machine. The control board shown lower right can be set for full automatic or semi-automatic operation.

shell from the pattern plate as can be seen in Fig. 5.

The plate is then sprayed with a parting agent and the cycle starts all over. To keep the temperature of the plate above 500°F the oven automatically comes forward and heats the plate to proper temperature before each molding cycle begins. Cooper Alloy uses silicon emulsion parting agents either DC7 or DC35 which can be sprayed by hand on through nozzles mounted in position on the machine.

After the hot pattern is removed from the machine, Fig. 6, the two shells are put together as shown in Fig. 7. A special binding tape, World-Bestos, is used to band the shells together. This tape will work over a wide range of temperature whereas the old practice of dusting on an adhesive, shown in Fig. 8, must be done while the shells are above 350°F. If the shells are not taped while hot the squeezing machine time cycle is merely prolonged and a good bond can be effected with tape as long as the shells are reasonably warm.

Taped shells are transferred to either of the two squeeze presses, one of which is shown in Fig. 9. About 600 lb pressure is applied to the assembled shells. The pressure is evenly distributed over the shells by 40 springs. About 2 min is required to seal the mold but this time varies with shell temperature.

The hard sturdy mold is then stored as shown in Fig. 10. The number stored in this rack only needs an area of 25 sq ft of floor space. The same number of sand molds to make the same casting would require a flat storage area of 250 sq ft.

The pour off area needed for shell molds is also much less than the pouring area needed for the same number of sand molds. A simple type pouring rack shown in Fig. 11 is used. In Fig. 12, the 12 shell molds are being poured in an area roughly 24 sq ft. In sand practice an area of 70 sq ft is required to do the same job.

Shakeout of catsings has always been a chore.

FIG. 7—The t[illegible]lls are bonded together by a black adhesive tape. The [illegible]ted sand cores are set in place prior to assembling the completed mold.

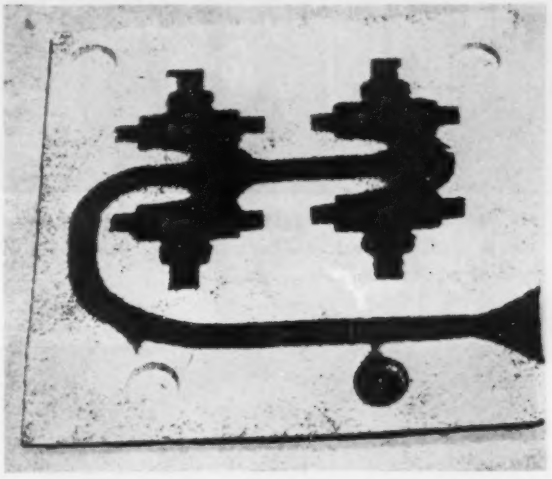
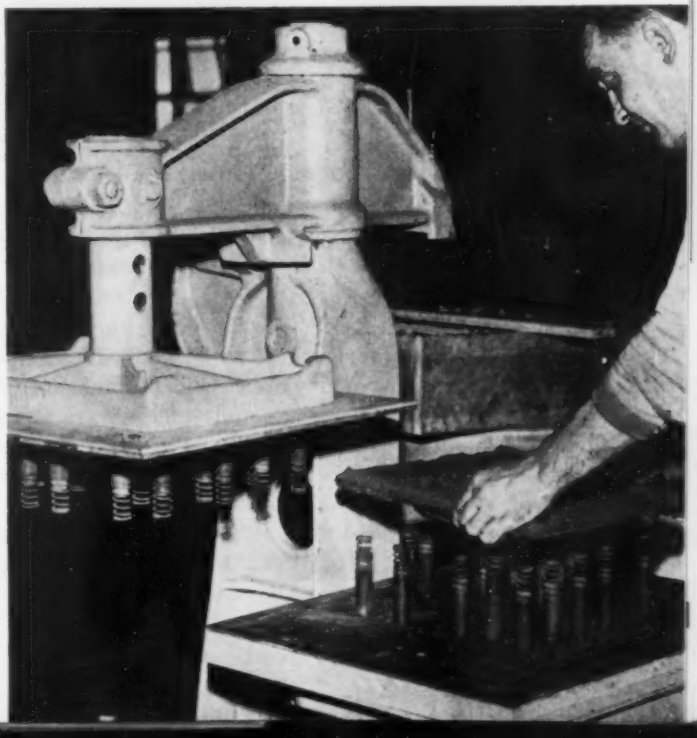


FIG. 8—The old method of bonding shells by sifting a white adhesive powder on the shell has been replaced at Cooper Alloy by the bonding tape shown in FIG. 7.

FIG. 9—The assembled mold is placed on the squeeze press and held under pressure until the tape affects the necessary bond. The heat of the shells cures the adhesive.



Shells decrease mold storage and pouroff areas. Don't shot blast shell cast surfaces.

FIG. 10—Finished shell molds can be stored indefinitely before used. This rack covering 25 sq ft of floor space will hold about 200 complete molds.

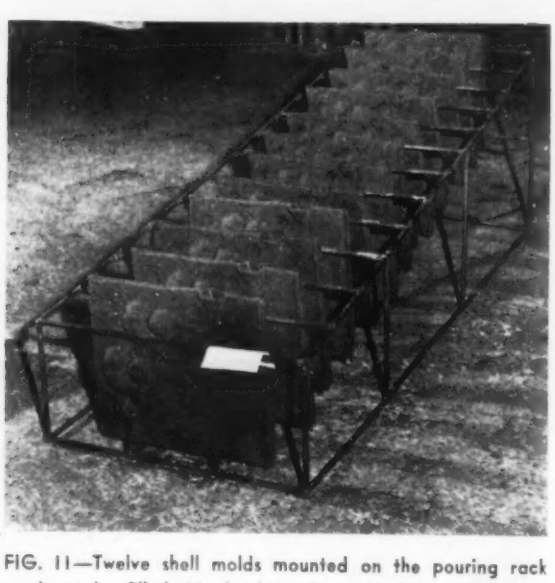


FIG. 11—Twelve shell molds mounted on the pouring rack ready to be filled. No backup of any kind is used in this foundry on any shell molds now in regular production.

Even with modern machinery considerable dirt and dust and expense are involved. Shakeout of shell molds is not as troublesome as are sand molds but if the shell is backed up with shot or sand the usual objectionable features of shaking out are encountered. Due to casting size Cooper Alloy has not found it necesary to back up any of their shell molds made to date. Shakeout is

FIG. 12—The pouring off area for shell molds is much smaller than that needed for sand molds.

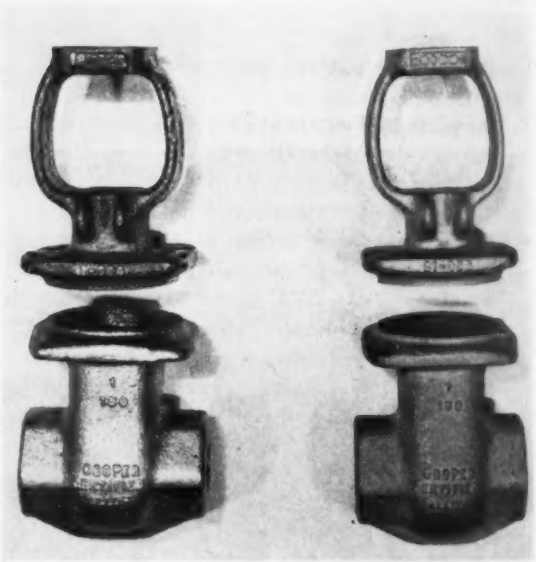


FIG. 13—The smooth as cast surface of shell molded castings is demonstrated above, right. The same valve body and bonnet cast in green sand is shown at the left. Shot-blast cleaning ordinarily is not used on shell cast parts as such cleaning roughens up the smooth finish.

therefore simple, fast and clean and adds greatly to better housekeeping in the foundry.

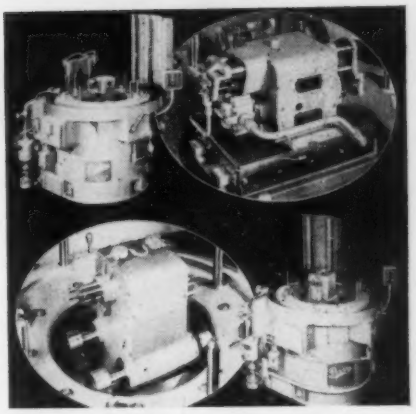
Cleaning castings is another operation in which time, dirt and expense are decreased when using shells. In fact the regular practice of shot blasting sand mold castings is not necessary and can be detrimental to shell castings. It has been found that the smooth surface of shell castings, shown in Fig. 13, are damaged or roughened by the shot blast. It is their practice not to blast clean except in special or unusual cases.

Further research is continuing at Cooper in all aspects of shell molding. Up to now the maximum size of casting has been restricted to smaller size valve bodies. This size range embraces the major portion of Cooper's regular valve and fitting business.

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 119 or 120.

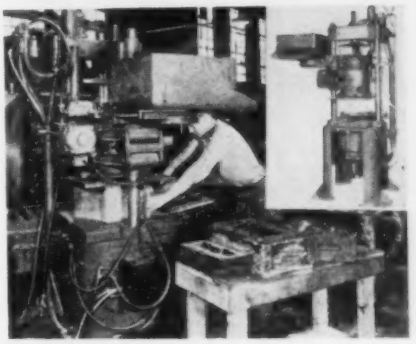
Drilling blind holes unevenly spaced



Two special machines drill and tap 24 blind holes, unevenly spaced and at different levels, on the inside of a jet-engine bearing support and in a working area too small to use a conventional drilling unit. A reciprocating-type drillhead is used, mounted on a hydraulically-operated way-type slide and including four drill spindles at each end. Drills are driven by a hydraulic motor with speed of tools easily selected by controlling the speed of the hydraulic motor. A special rotary table features irregular spacing and is electrically interlocked in such a way that the holes can be drilled only in their proper relative positions. The tapping machine (illustrated above) functions on the same principle, except taps are driven by master lead screw. *Buhr Machine Tool Co.*

For more data circle No. 18 on postcard, p. 119.

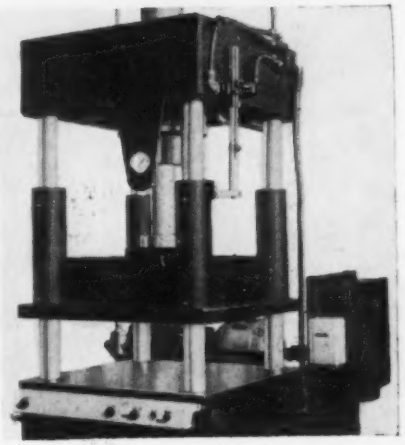
Machine boosts core production



With the new Pulsator Model San-Blo core blowing machine, wooden core boxes can be blown as successfully as metal boxes. The same wooden boxes used by bench core makers, for ramming by hand, can be used. They need no special rigging and rarely require venting. The machine blows cores with two, three or four short, quick blows, permitting close control of air pressure within the core box, keeping it low during the blowing cycle. The San-Blo also features a mechanized sand magazine, using motor-driven plows and an aerating air circuit to move sand to the blow hole and carry it into the core box. *Federal Foundry Supply Co.*

For more data circle No. 19 on postcard, p. 119.

Guided platen press molds plastics



New plastics presses are electrically powered and hydraulically operated. They are built of welded steel throughout, and have the rigidity necessary for accurate molding of plastics. Dual palm operated switches assure safety for the worker. When contacts are made, the movable platen advances quickly to the work; just before contact with the work it slows down automatically under the control of a limit switch with adjustable stroke. Heated platens are available. Pressure applied can be limited during the cure from half to full rated load of the press. An electric timer retains this pressure for duration of the curing cycle, adjustable from 12 to 400 sec. At cycle end, the movable platen returns automatically to starting position. Standard press capacities range from 25 to 300 tons. *Dake Engine Co.*

For more data circle No. 20 on postcard, p. 119.

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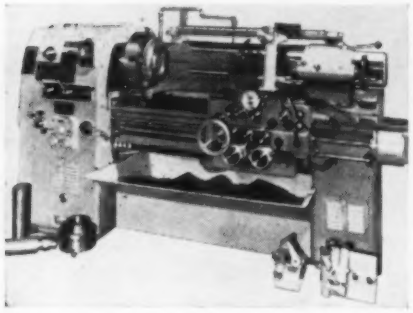
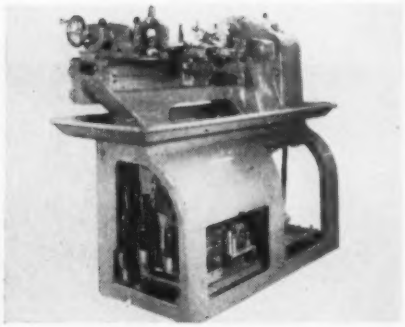


Copying lathe will make 90° cuts on workpiece

Copying device of this Sensitast lathe, controlled by electromagnetic clutches, makes 90° cuts on the left or right side of a workpiece. Almost any outside or inside form can be copied. Traverse and longitudinal feeds operate at the same rate to produce a smooth, uniform finish on the entire workpiece. To obtain a higher degree of finish, a feed reducer with magnetic clutch control is employed. Extremely heavy cuts can be made. Lathe has 17-in. swing over cross slide, 28 in. over saddle and 37 in. over bed cover. Distance between centers is 39 in. *Cosa Corp.*

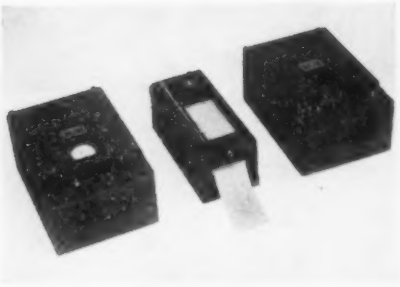
For more data circle No. 21 on postcard, p. 119.



Electronic drive provides close speed control

An infinitely variable electronic drive for the Hendey 9x24-in. tool and gagemaker's lathe fits into the base of the lathe as an optional control for the 3 hp, dc, adjustable speed motor. The unit contains two 18 amp, heavy-duty electronic rectifier tubes in the power circuit, and one smaller rectifier tube in the control circuit. It provides a stepless speed from 25 to 3000 rpm, by potentiometer control offield and armature of the motor. Thermal overload relay protects motor from sustained overloads. Dynamic breaking accomplishes full stop from maximum speed in approximately 1½ sec. *Hendey Machine Co.*

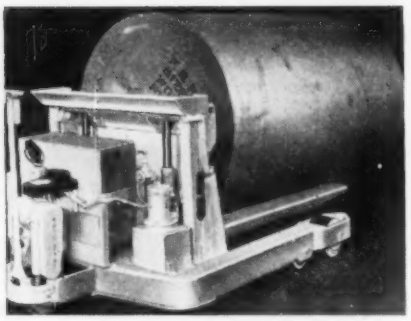
For more data circle No. 22 on postcard, p. 119.



Analyzer records resistance welder variables

Single-phase and three-phase resistance welding machine variables can be recorded on a new direct writing welding analyzer. Welding current and electrode force are measured and recorded simultaneously, and show the squeeze, weld, hold, and off time intervals. The instrument also records small 180 cycle per sec component present in the three-phase welding machine current when ignition rectifiers are used. The welding machine can be adjusted as the measurements are being made. *Brush Development Co.*

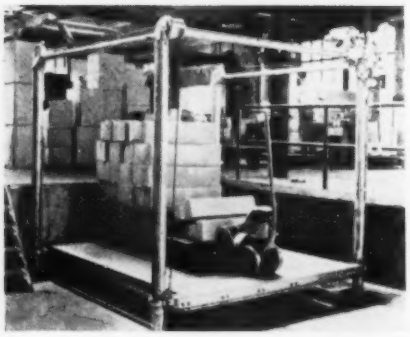
For more data circle No. 23 on postcard, p. 119.



Lift truck has 8000 lb capacity

New Moto-Truc is powered by 18 v battery power unit and has a maximum 14-in. hydraulic lift. Load length is 8 ft. Dual 10-in. and 7-in. load wheels prevent wedging of front wheels in floor slats. Travel speed is 2½ mph loaded and 3 mph unloaded. Dead-man controls are standard with automotive type brake applied to the drive wheel. All-welded construction offers heavy, rugged service. Truck is designed as a Walkie unit to afford smaller turning radius. *Moto-Truc Co.*

For more data circle No. 24 on postcard, p. 119.



Centrifugal governor added on Leveler

Improvements on a low cost leveling device for plant or warehouse use includes a centrifugal governor which acts as an emergency brake; top and bottom automatic stops have been made more positive. With the Leveler material can be moved through a plant having different floor levels or loaded onto trucks or boxcars without removing it from the original carrier. Loads to 6000 lb can be raised 5 ft in 50 sec, it is reported. Installation requires no sub-surface preparation. Platform, 8x6 ft 6 in. is controlled by four lifting cables of plow steel having total strength of 26,400 lb. *Service Caster & Truck Corp.*

For more data circle No. 25 on postcard, p. 119.
Turn to Page 134

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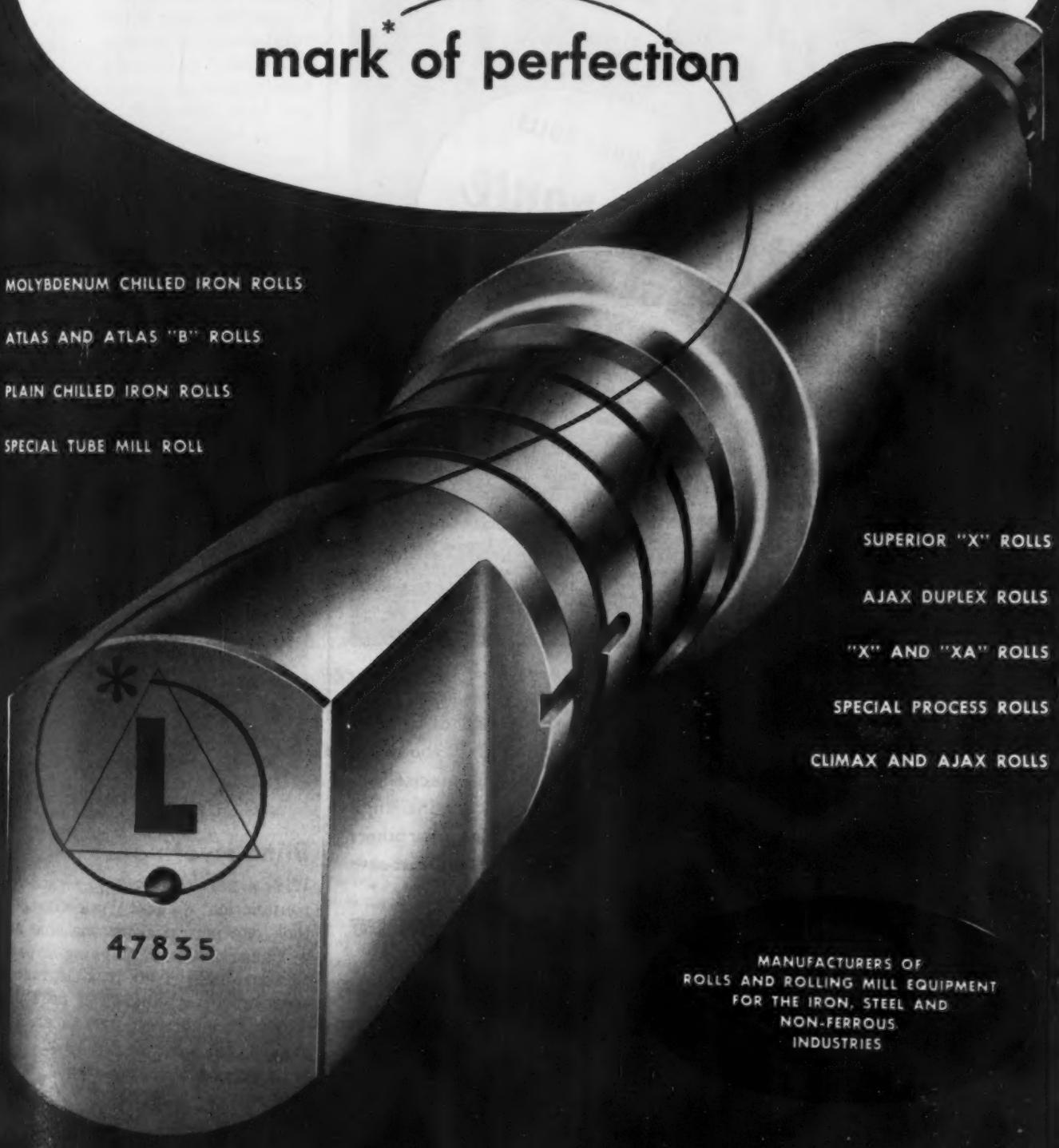

MOLYBDENUM CHILLED IRON ROLLS

ATLAS AND ATLAS "B" ROLLS

PLAIN CHILLED IRON ROLLS

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SUPERIOR "X" ROLLS

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FOR close-knit strength and added life, here's a combination you just can't beat—Shenango *centrifugally* cast parts of Meehanite Metal. It is *double* assurance of finer, more uniform, pressure-dense metal, plus freedom from blow holes, sand inclusions and other defects!

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—New Equipment—

Continued from Page 124

Polishing machine

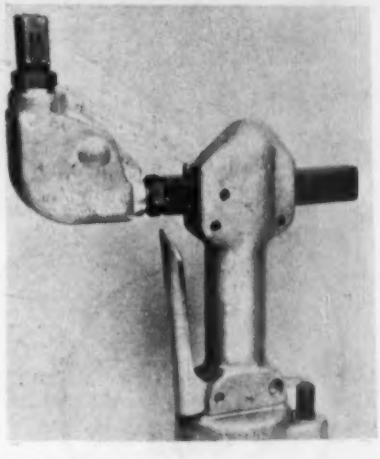
New polishing machine is designed for light buffing, coloring and scratch brushing. It is equipped with two self-aligning ball bearing pillow blocks and has a ¾ in. diam spindle 22 in. long. Spindles are turned down at the ends to ½ in. diam and threaded eight square threads to the inch. Spindle is tapped for taper points which are furnished with machine. A switch, 8-ft cord, V-belt and a device for keeping belt at a uniform tension are also furnished. Machine is driven by a ¼ hp ac or dc motor mounted on the stand; weighs 100 lb; is portable. *Lewis Roe Mfg. Co.*

For more data circle No. 26 on postcard, p. 119.

Plastic packing

Extruded Teflon plastic packing resists acids, caustics, problem solvents. It is composed of shredded Teflon, blue asbestos, combined with suitable binders and lubricants, extruded into an open cotton yarn jacket which confines it and makes installation easy. *Flexrock Co.*

For more data circle No. 27 on postcard, p. 119.



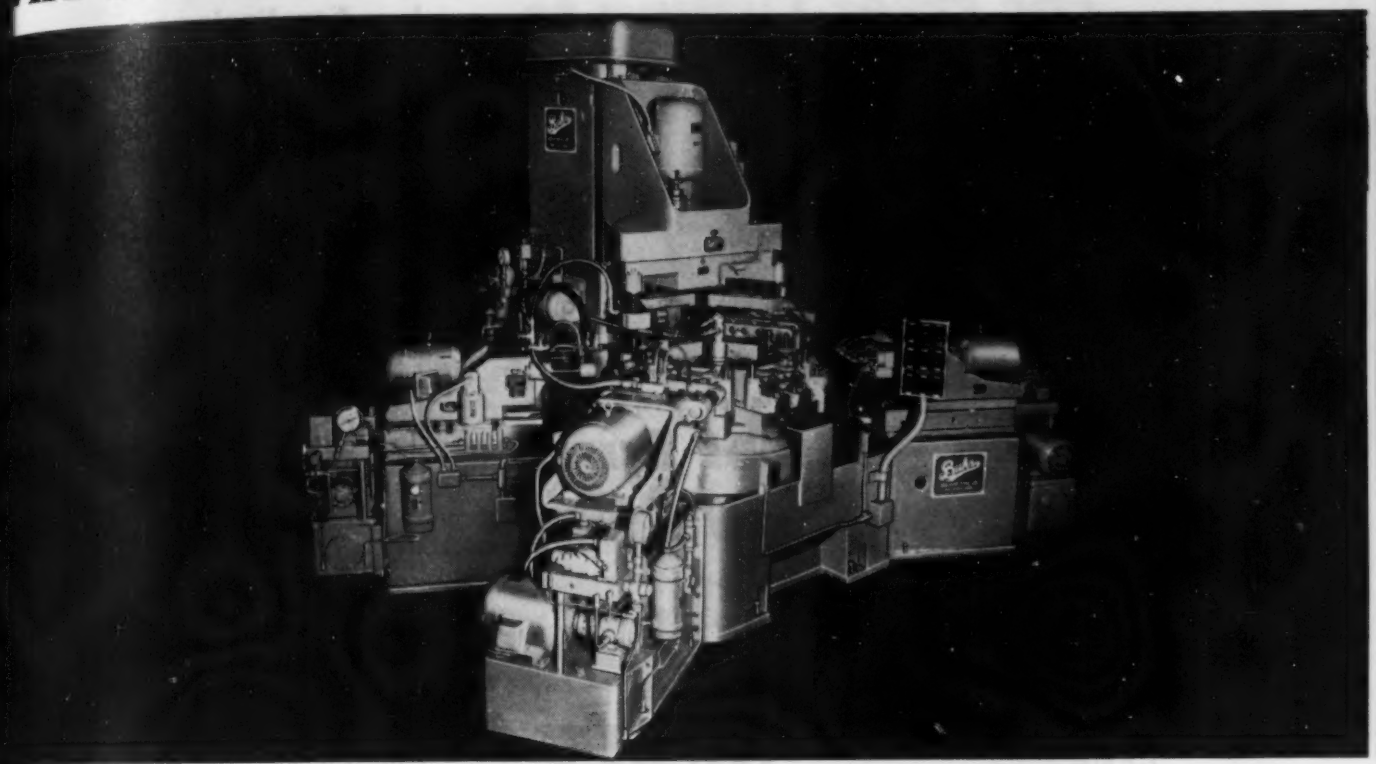
Blind riveting

With a new angle adapter used in conjunction with a Huck riveting tool, one person from one side of work can drive self plugging or pull through blind rivets in a clearance space of only 4 in. from nose of tool to back face of angle facer. It expands the scope of blind riveting to many additional assembly and maintenance applications. *Huck Mfg. Co.*

For more data circle No. 28 on postcard, p. 119.

Turn Page

WHY DOAKES GETS FROM BANFF TO TALLAHASSEE



What are the travel and automobile agencies reporting every season? . . . That Joe Doakes—the typical American—is taking more vacation and traveling farther year after year . . . And here's one of the reasons why—this Buhr Five-Way Horizontal-and-Vertical Hydraulic-Feed Drilling Machine . . . the Machine which one of the world's leading Auto Makers uses "around the clock" for producing Rocker Arms in such volume and at such low cost that . . . Joe Doakes may afford to drive thousands of miles for vacations—literally from Banff in west Canada to Tallahassee, Fla.

Auto Maker Chooses This to Turn Out 880 Pieces an Hour for Utmost Economy

As each new model comes off the auto assembly lines, the battle to cut production costs becomes more intense. Not long ago, one of the big auto companies concentrated on how to make a certain rocker arm most economically.

Here Was Their Problem

To secure a piece of production equipment which would perform 7 operations on the rocker arm, including tapping, drilling, endmilling, chamfering and spotfacing—that was the problem.

As the company to design and manufacture the Special Machinery to solve this problem, they chose Buhr.

What the Machine Does

In general—it drills 8 holes, drills through 4 more holes, taps 4 holes, endmills 4 places, spotfaces 4 places and chamfers 4 previously drilled holes. It is equipped with 42" automatic Index Table and six-station Holding Fixture, loading four parts per station. Parts are automatically clamped while fixture moves from loading position into first working station, and are automatically unclamped while Fixture moves from last working station to unloading.

Specifically, the Machine does this—

Station 1—Load and Unload

Station 2—Vertical, idles; Horizontal, taps and drills (4) 7/16-20 holes

Station 3—Vertical, endmills (4) 1/2" Radius places; Horizontal, chamfers (4) previously drilled holes

Station 4—Vertical, drills (4) 1/8" dia. holes 5/16" deep; Horizontal, idles

Station 5—Vertical, drills (4) 3/32" dia. holes through; Horizontal, spotfaces (4) 15/16" dia. places

Station 6—Vertical, idles; Horizontal, taps (4) 7/16-20" S.A.E. holes

PRODUCTION—880 pieces per hour at 100% efficiency.

Why Buhr Was Called In

Leading Automobile Manufacturers have done business with Buhr for more than a quarter-century. . . . They know Buhr's record for dependable Special Machinery . . . and for delivering on time. . . . They're familiar also with Buhr's excellent manufacturing facilities . . . and their experienced, trustworthy and specialized sales and engineering staffs. Consequently . . . for Special Machinery like this . . . it is second-nature for them to call Buhr.

For Details About Buhr

A comprehensive Catalog . . . or a personal call from a Buhr Sales Engineer . . . is yours for the asking wherever you are located in the United States! . . . For every problem involving this type of Special Machinery—including the type which helps Joe Doakes get from Banff to Tallahassee—phone, wire or write us.

BUHR MACHINE TOOL CO.
Ann Arbor, Michigan
Phone: Ann Arbor 2-5646—5980
Detroit WOodward 3-2126

Buhr ***SPECIAL MACHINERY . . . Leaders Make Sure with BUHR***

For Freer Cutting to EXACT SIZE...

Without Burring or Welding-

Get

BESLY TAPS

UNSURPASSED ACCURACY

at all Vital Points

Microcentric CHAMFER
Micro finish, concentric to tenths of thousandths. Cuts freely and to size without burring or welding.

Solid Ground THREAD FORM
For angle and lead accuracy, elimination of gauging problems and control of pitch diameter to tenths of thousandths. Ground from the solid.

Accurate RAKE ANGLE
Predetermined degree of rake precisely held and gauged to exact customer specifications.

Mirror Finish FLUTES
Correctly designed to provide freer chip flow and longer tap life.

Tru-Square DRIVER
Square and shank fit correctly in chucks and holders, no wobble to cause oversize holes.

BESLY DRILLS and REAMERS
High-Speed Cutting tools available in a complete range of types and sizes — made to the same high standards as Besly Taps to reduce your cost-per-hole.

Besly Taps and better tapping at lower costs go hand-in-hand! *Microcentric Chamfer* assures free cutting to exact size — without burring or welding — chamfer that's *right from the start!* But accuracy of chamfer is just one of many reasons why Besly Taps will save you money and serve you better. Glance down the list of Besly advantages at the left to see why Besly Taps are so outstandingly superior in cutting cost-per-hole. Then add the fact that Besly's delivery is reliably *fast* and that expert tap engineering counsel is yours for the asking.

See your nearest Besly distributor or mail the coupon — today.

BESLY-WELLES CORPORATION

Established as Charles H. Besly and Company in 1875
104 Dearborn Ave. BELOIT, WISCONSIN

BESLY TAPS, DRILLS, REAMERS
BESLY GRINDERS and ACCESSORIES
BESLY-TITAN ABRASIVE WHEELS

BESLY-WELLES CORPORATION
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BELOIT, WISCONSIN

☐ Send your serviceman to discuss our tapping problems

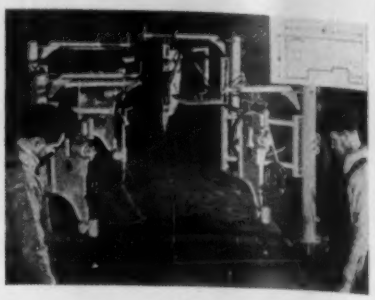
Please send Free manuals as checked.

☐ TAP APPLICATION GUIDE
☐ TAP CATALOG
☐ DRILL CATALOG

NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

—New Equipment—

Continued



Torch guiding machine

The Ultra-Graph automatically controls path and speed of oxy-acetylene torch cutting. A strong permanent magnetic field provides positive attraction of power driven friction rotor to the edge of a steel pattern. Ample speed control is provided for cutting material from 1/16 to 8 in. thick. It handles fine detail work with tolerance of ±1/64 in. Unlimited variety of complex pattern shapes may be used including a 63-in. straight line, 32-in. diam complete circle, and 76-in. diam semi-circle. *Heath Engineering Co.*

For more data circle No. 29 on postcard, p. 119.

Power take-off unit

The new Tangen power drive is mounted directly on top of the regular transmission in a truck. No V-belts or pulleys are required. It is capable of delivering 97 pct of the truck engine power that is transmitted direct from main gear drive in the transmission. Speed of the power drive shaft is in direct relation to crankshaft speed regardless of the gear ratio being used in the transmission. *Mobile Power, Inc.*

For more data circle No. 30 on postcard, p. 119.

Coolant cleaner

A powerful magnetic unit 1⅛ in. diam x 8 in. long suspended under pump intake in a coolant tank will trap all floating steel particles. The unit accumulates a mass of chips 4½ in. long and 1 in. thick around its entire circumference. Load is removed by pushing wiper ring to opposite end of tube. Cleaner is not for heavy production grinding. *Multifinish Mfg. Co.*

For more data circle No. 31 on postcard, p. 119.

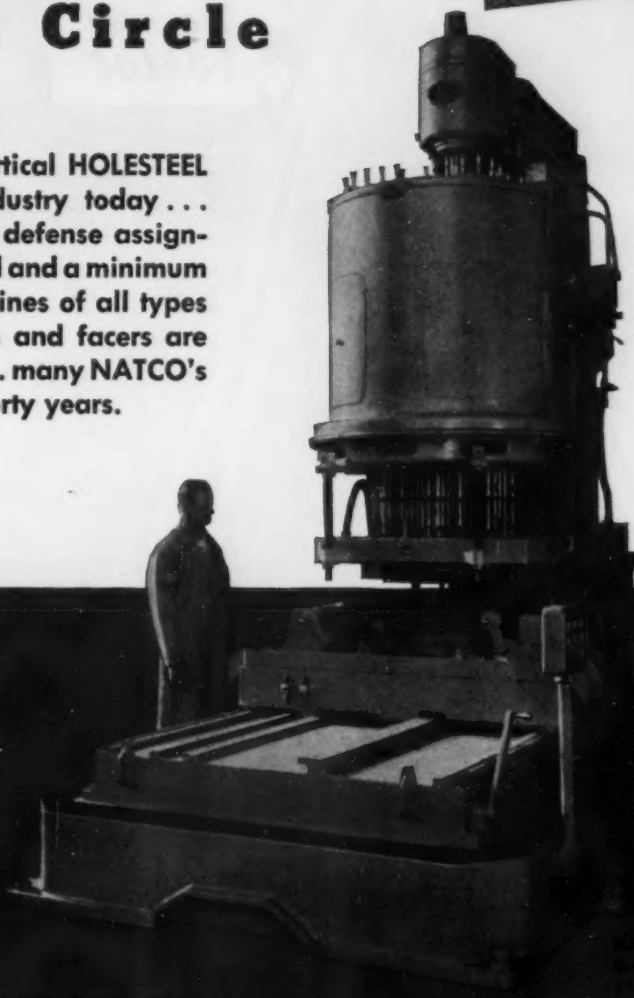
Turn Page

MAMMOTH NATCO

Drilling 50 Holes on 36″ Bolt Circle

Natco Engineered for Quality Production

NATCO Model C4B Vertical HOLESTEEL drillers are at work for industry today . . . doing tough peacetime and defense assignments with a maximum speed and a minimum of down time. NATCO machines of all types . . . drillers, borers, tappers and facers are veterans of years of service . . . many NATCO's are now in operation over forty years.



THIS TANK TRANSMISSION PART FOR EXAMPLE . . .

50 holes in this rear gear case are combination 2 diameter drilled in two minutes . . . 30 parts per hour . . . day in and day out . . . just one example of NATCO economical production.

Call a Natco Field Engineer

to help you solve your problems in Drilling, Tapping, Boring and Facing

NATCO

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Indiana

Branch Offices | *1809 Engineering Bldg., CHICAGO • 409 New Center Bldg., DETROIT*
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ACCO Registered DUALOC Slings are Lifting Tools

• DUALOC Slings, whether strand-laid or cable-laid, provide the material handling engineer with a tool of known strength and safety factor throughout. The design is modern . . . tested . . . and proved in service.

The DUALOC Ending insures sling strength equal to the FULL catalog strength of the wire rope, and the "Registry" specification requires that all fittings have strength equal to that of the wire rope. These are the basic reasons why ACCO *Registered* DUALOC Slings have set industrial sling standards.

You can get DUALOC Slings and Fittings from the stock of your ACCO Sling distributor. See him today or write our nearest district office for his name.

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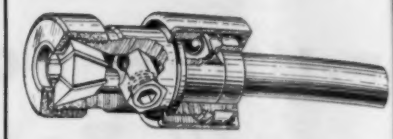
ACCO Registered DUALOC Slings



Tap holder

New self-releasing tap holder will work either right or left hand threading and depends upon steel balls for its releasing action. It accurately controls depth of thread. Ball action will engage and release to accommodate feed rate. *Roddick Tool Co.*

For more data circle No. 32 on postcard, p. 119.

Pressurized guns

Pressurized Flo Guns handle caulking and sealing compounds, mastics and L. P.-2 materials on standard air line pressures or can be hand screw pressured. Three sizes, six combinations, barrels of three different materials, two types of nozzles are available. Disposable barrels on the small gun are for use with extra sticky or fast setting compounds. *Salsbury Corp.*

For more data circle No. 33 on postcard, p. 119.

Speed clip

New dart-shaped Speed Clip eliminates the use of metal reinforcing strips, rivets and washers in fastening air seal rubber strips to army tank engine shrouds. The Speed Clip is inserted into prepunched holes and driven securely in place with a light stroke of a hammer or mallet. Clip is made of heat treated spring steel and fits into a 0.312 in. diam hole. Dart is 21/32 in. long. *Tinnerman Products Inc.*

For more data circle No. 34 on postcard, p. 119.

Drum switch

Small reversing drum switches have rugged overall construction for long, trouble free operation. Indexing is smooth and easy, positive and shock proof. Operating mechanism is convertible for maintained or spring return action. Screw type terminals are provided and terminal blocks with contact fingers are easily replaceable. *Square D Co.*

For more data circle No. 35 on postcard, p. 119.

Electric screwdriver

A new motor-in-hand tool is a lightweight electric screwdriver, small size, designed to be used without fatigue at right angles to the work. Unscrewing is possible by inserting a bit into the top chuck and turning the machine over in the hand. Handy slip clutch assures even screw tension and eliminates stripping of threads. Two models drive free-running screws or nuts from Nos. 0 to 4 and Nos. 4 to 8. *Dremel Mfg. Co.*

For more data circle No. 36 on postcard, p. 119.

Industrial guardrail

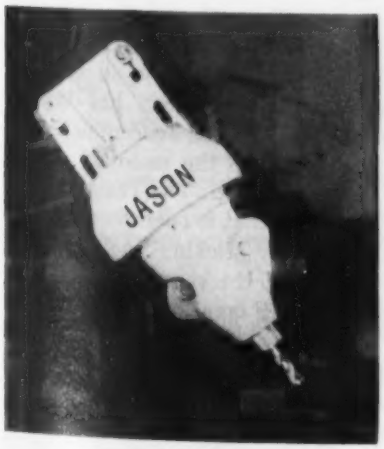
Flex-beam Guardrail is used to protect walls, partitions, parking lots and other bump-spots in industrial plants. It is a beam-type rail, deeply corrugated for strength and erected without tension. It is fabricated from semi-spring quality steel and punched for mounting on 12 ft 6 in. centers. Splicing is by seven heat-treated high carbon bolts. Waterproof, rust-inhibiting paint primer is applied after fabrication. *Armco Drainage & Metal Products, Inc.*

For more data circle No. 37 on postcard, p. 119.

Milling attachment

Multi-purpose milling attachment will operate at any angle. Designated Model 51, this heavy duty but lightweight unit takes up to ¾-in. end mills and is intended for production where speed, accuracy and sturdiness are factors. *Jason Mfg. Co.*

For more data circle No. 38 on postcard, p. 119.



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an ACCO product

Lock 'em—and Leave 'em

● If you have a problem lifting, moving or containing bundles of bars, rods, or pipes—forget it. Get some of the new AMERICAN Bundling Chains with automatic locks. They're easy to hook up, and once you lock them, they stay locked. Yet you can unlock them with a flip of the fork. Satisfied users tell us they have made possible real savings in handling costs.

Write today for information on Bundle Locks or the 1001 other items in the complete AMERICAN Chain line.

(Patent Pending)

ACCO

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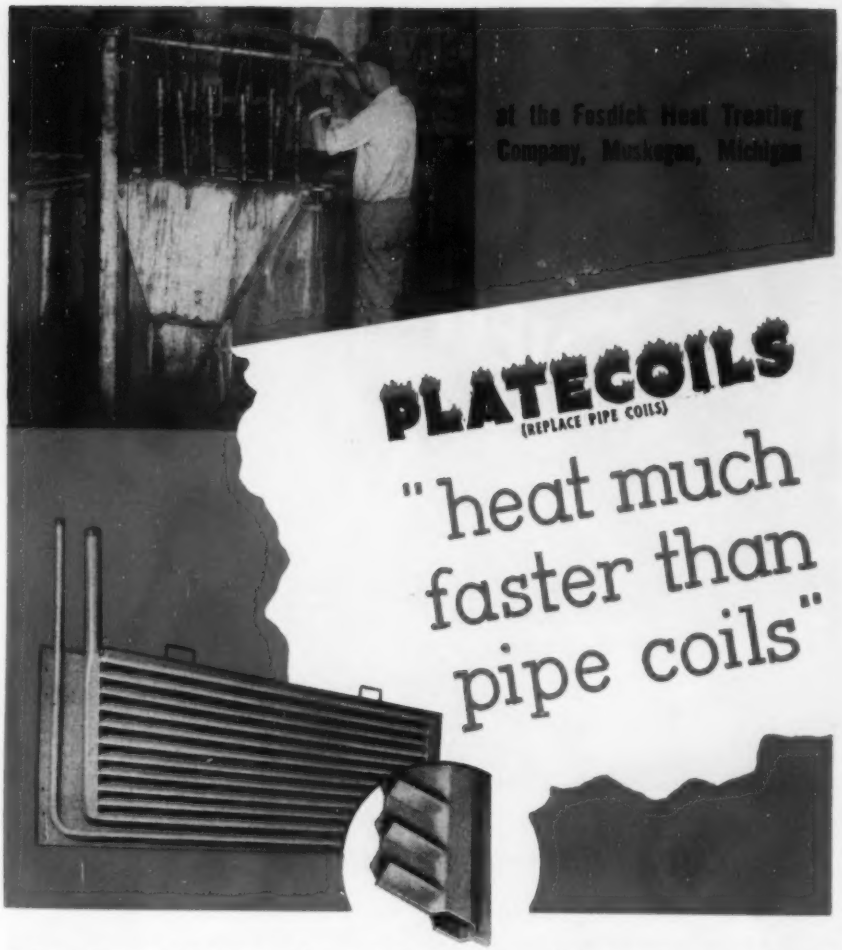

at the Fosdick Heat Treating Company, Muskegon, Michigan
PLATECOILS
(REPLACE PIPE COILS)
"heat much faster than pipe coils"

When Earl Fosdick, President of Fosdick Heat Treating Company, heard about the advantages of Platecoils, he wanted to try them in such a hurry that he flew to the Factory and picked up his first unit. This first Platecoil proved so satisfactory that he ordered a second unit SHIPPED AIR EXPRESS.

Each Platecoil heats a copper plating tank used in the heat treating of cam shafts for diesel engines. The Platecoils heat much faster than the pipe coils they replaced, so it's possible to start plating much earlier on Monday morning after the week-end shut down. In addition, the Platecoils require less space in the tanks giving them more plating capacity.

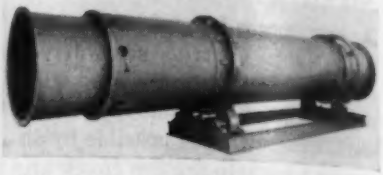
Platecoils heat faster than the pipe coils because they have more prime surface in a given area. A 22" x 47" Platecoil has the same heat transfer surface as 32 feet of 1½" pipe which occupies approximately 30" x 60" of space. This means better than 50% savings in space and material, and results in a lower initial cost.

Platecoils' faster heating coupled with their unusually low maintenance costs provide savings that are too great to be ignored. It costs nothing to see what Platecoils will do for you. *Airmail your request today for your copy of bulletin No. P73.*

PLATECOIL gives you these ADVANTAGES

- Cleaned and Repaired Without Dumping Tank Solution
- Greater BTU Transfer Per Unit Area
- Weighs Only Half as Much as Pipe Coil
- No Threaded Joints in Tank
- Increased Tank Capacity
- Fast, Easy Installation
- Easy to Clean

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN



Aluminum chips dryer

Reclamation of aluminum chips and machine tool cuttings is speeded with a rotary dryer 5 ft in diam, 30 ft long and of double-shell construction. Cuttings are fed directly into the dryer, into a 1000° temperature. Grease and coolant compound on the metal is evaporated or partly burned by combined action of high temperature and contact with the burner flame. The dryer is direct fired, countercurrent type, ordinarily fired by gas. *Standard Steel Corp.*

For more data circle No. 39 on postcard, p. 119.

Can sealer

An accessory to the Wassco Glo-Melt soldering unit seals can type containers used in manufacturing of relays, condensers, crystals, transformers, in the electronics field. It solders joints on cylindrical, rectangular or tubular metal housings. The unit operates on the principle of resistance soldering, with no waste of flux and no burn, shock or visual arc hazard to the production worker. A set of eight adjustable carbon tip holders mounted on a plastic base comprise the unit. Enclosures 4 in. wide and 4 in. or more high can be soldered. *Wasserlein Mfg. Co.*

For more data circle No. 40 on postcard, p. 119.

Reamers

A new line of reamers uses one shank with interchangeable heads. Reamers are available in spiral or straight flute. Head has tapered hole that insures concentricity and a snug fit on the smoothly ground tapered shank. The reamer is designed so that it operates free from binding or sticking due to cutting portion of the reamer wearing undersize and creating negative relief. Replacement costs are cut and savings are possible because shank material is less expensive steel. *Tomkins-Johnson Co.*

For more data circle No. 41 on postcard, p. 119.

Turn Page

HOW TO SAVE MONEY ON STAMPING RUNS OF LESS THAN 10,000

. . . the exclusively short run supplier is NOT always the best source

The Methods Engineer, skilled in stamping practice, will tell you that a run of 10,000 or less might be produced by any one of three methods. Here's what decides which is the most economical:

1. **The quantity of each run**
2. **The *total* requirement for the part**
3. **The costs of various *types* of dies**
4. **The labor factor**

Quantity alone does not decide the method.

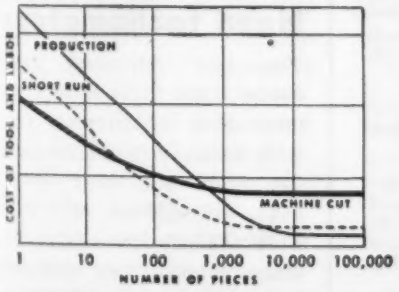
FOR EXAMPLE: TAKE THE PART ILLUSTRATED

If your total requirement is 1 to 65 parts, our Machine-Cut Method is the most economical. You pay no die costs whatsoever.

If your total requirement is for 65 to 7,000 parts, the Short Run Method using our exclusive Hecht-type dies, combined with specialized bench press operations, is most satisfactory. Die costs are extremely reasonable.

If your total requirement exceeds 7,000 parts, the standard Production Method, using the best quality dies, gives the lowest unit cost. Die costs, though higher, can be spread over a greater number of parts.

The logarithmic chart below shows the computation which the skilled Methods Engineer makes to arrive at this conclusion, for the particular part illustrated. Though the computation varies for almost every part, the general principle remains the same.



Send today for our free, 12 page booklet full of helpful facts on buying stampings. Profusely illustrated.

THE MOST IMPORTANT ECONOMY FACTOR IN BUYING STAMPINGS IN LIMITED QUANTITIES

Whenever possible, advise your stampings supplier of your total requirements. Your *second order* of the same part may justify a production-type die on the *first* order. The chart at left illustrates this. Whenever you can, avoid buying the expensive labor factor that is necessarily figured in the Machine-Cut or Short Run Methods.

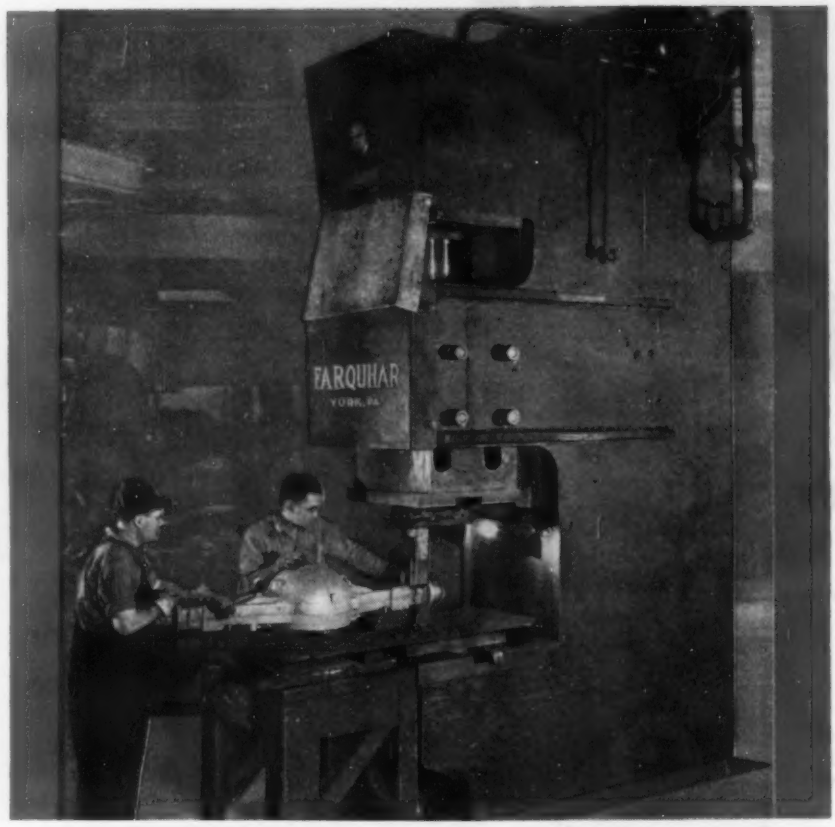
Get your quotations from a stampings supplier who can impartially quote you on the most efficient production method. This will be the supplier, like our Stampings Division, who is equipped for all three!

STAMPINGS DIVISION

LAMINATED SHIM COMPANY, Inc.

3206 UNION STREET *ESTABLISHED 1913* GLENBROOK, CONN.

FOR EFFICIENT PRODUCTION — WHETHER ONE PART OR A MILLION



ALBION MALLEABLE IRON CO.
cuts cold-shearing costs with

FARQUHAR Hydraulic Press

The Albion Malleable Iron Company produces automotive castings at its Albion, Michigan plant. Cold-shearing the gates from the castings in this modern plant requires dependable, trouble-free equipment, and for this equipment Albion turned to Farquhar engineers. After studying the problem, Farquhar recommended a 200-ton self-aligned, gap-type Farquhar Hydraulic Press. This press not only proved completely satisfactory in operation, but was also able to effect substantial economies because it was designed *specifically* for the job in hand.

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in heavy production. Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve whatever production problem you may have. Give them a call.

Send for Free Catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industry. Write to: A. B. FARQUHAR CO., *Hydraulic Press Division,* 1503 Duke St., York, Pa.

Farquhar
HYDRAULIC PRESSES
for Bending • Forming • Forcing • Straightening • Assembling • Drawing

A. B. FARQUHAR COMPANY Division of THE OLIVER CORPORATION

Metal melting furnace

Quality melts of alloy irons, tool steel and stainless steel are claimed for a redesigned electric metal melting furnace. It is designed for speed and uniformity of melts for limited production. A new rocking controller makes the furnace completely adjustable in operation and easier to manipulate. Three phase reversible motor causes the rocking action during melting and tilts the furnace for pouring. Type GMS furnace is complete with transformer, ready for installation in the foundry. Capacity is 60 lb. It operates at 30 kw. *Detroit Electric Furnace Div., Kuhlman Electric Co.*

For more data circle No. 42 on postcard, p. 119.

Centrifugal fan

New non-overloading, centrifugal fan, said to be 90 pct efficient with only 1/3 of the noise intensity of previous models is designed for industry, power, and commercial building needs. Fans have wheel sizes from 40¼ to 108¾ in. diam and can deliver volumes up to 600,000 cfm. Airfoil blade design with simultaneous aerodynamic changes in inlet and casing has boosted mechanical efficiency. *Westinghouse Electric Corp.*

For more data circle No. 43 on postcard, p. 119.

Hand tachometers

Two new universal and single range hand tachometers are speed measuring instruments covering a wide range without frequent shifting from one range-step to the next, or without shifting at all. Both feature knife edge hand that makes almost two complete turns for each range, resulting in long scale with wide open divisions, easy to read at all points. Cross pendulum operates on centrifugal governor principle with advantage of balanced construction for accurate readings in any position and immunity against changes in temperature, electricity, magnetism or moisture. *O. Zernickow Co.*

For more data circle No. 44 on postcard, p. 119.

Strike Attrition Closing Many Defense Plants

Steady stream of cutbacks will turn into a torrent if strike lasts another week . . . Secret meeting fails to break deadlock . . . Steel union is trying divide-and-conquer tactics.

Consumers are sounding a frantic note in the steel market this week.

Plant by plant, the awful attrition of the strike is beginning to bring manufacturers to their knees. Hit first and hardest are defense plants which need special types of steel. But other manufacturers are being forced to curtail production, too.

Last week's first trickle of cutbacks has already mounted to an imposing list. Another week of strike will turn the steady stream of plant closures into a torrent. Once these plants have closed it will take 2 weeks or more to get them into operation—even after steel production is resumed.

Slowing Down—The impact of plant closures for lack of steel is worse than it sounds. All vendors and suppliers of these plants are being notified by telegram to stop shipment—in some cases to stop production. The closing of one plant for lack of steel usually snafus the production schedules of at least several other suppliers. In some cases firms that have made commitments on what they thought were firm contracts are encountering real hardship.

The steel vacuum is beginning to strangle auto plants, too. Despite rapidly sinking supplies they are making every effort to operate through June. They fear that cutbacks now might jeopardize future steel quotas set by the National Production Authority. This is likely to result in completely empty pipelines which will make production even more difficult to get rolling when steelmaking resumes at the strike's end.

Secret Meeting—A secret meeting between steel company and union officials in New York over the weekend failed to break the deadlock. Neither side appeared ready to cave in on the one issue holding up a settlement—the union shop. Negotiations failed.

Union strategy, meanwhile, will be one of divide-and-conquer. Its only hope of victory apparently lies in persuading one of the large producers to sign up. It used these tactics successfully in 1949 when Bethlehem Steel Corp. broke the solid front against pensions and other producers fell in line.

Only Hope—If union chief Phil Murray persists in refusing to trade the union shop, President Truman will be left holding the red hot steel case. Use of the Taft-Hartley Act appeared this week to offer the only hope of an early resumption of steel production. By the end of this week the production loss will amount to 9.5 million tons of ingots.

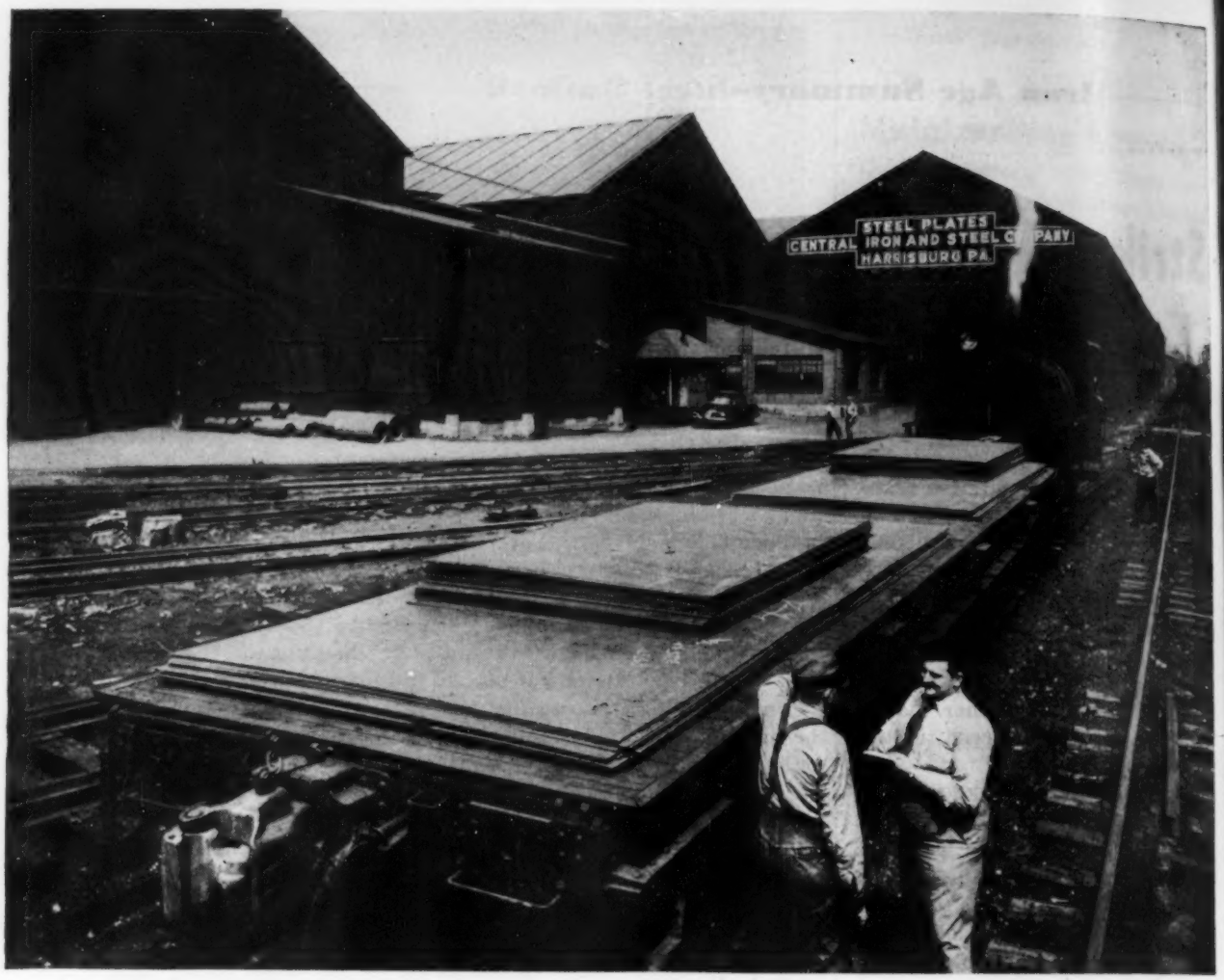
While Mr. Murray probes for a union shop opening, he has plenty of other problems to deal with. He has the job of explaining to steelworkers why the strike continues when steel companies have offered to meet most economic demands.

Sample Vote—If they were given the opportunity, many steelworkers would accept the industry's last offer of 24.6¢ per hr in wages and fringe benefits without the union shop. A poll, conducted by the *Beaver Valley* (Pa.) *Times* indicated an overwhelming sentiment by steelworkers to accept the offer. Of 717 ballots received, 630 favored accepting the industry offer and returning to work, while 87 were opposed. Affirmative votes were 87.9 pct of the total.

The offer to reopen a few steel plants for limited defense production also poses a problem for Mr. Murray. He will have to explain to jealous locals why some workers are allowed to go back to work while others remain idle. Apparently this is a factor in delaying resumption of this high priority, emergency production. Originally National Production Authority and the Munitions Board were supposed to decide what plants would reopen. After more than a week, announcement of a tentative list was still being withheld. U. S. Steel, which makes practically all defense steel items, was not being considered for reopening—apparently because of union veto.

Will Ship Steel—If it was going slow on plant reopenings, the union was not dragging its feet on the plan to move finished steel from struck mills and warehouses for defense use. Movement of this material was scheduled to get under way this week. Only finished steel bearing A to E, Z-2, and B-5 suffix ratings will be shipped. This covers material for military and Atomic Energy purposes, for metalworking machinery and equipment, and component parts for defense end products.

Steel Scrap Falls—Heavy melting steel, the last stronghold in the scrap market, fell victim to the steel strike this week. The steelmaking grades were $2 to $5 a ton lower in several market areas. This lowered THE IRON AGE scrap composite price to $39.50 per gross ton, the first free market adjustment since prices were frozen Feb. 7, 1951. Cast scrap and blast furnace grades were already selling below ceiling.



"Blue plate special" for industry

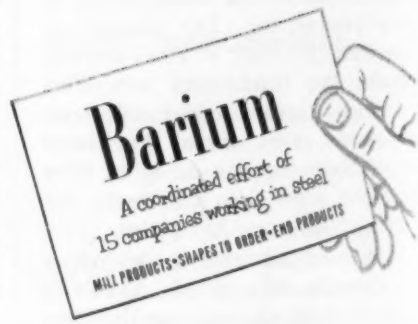
Here's a tempting, mouth-watering sight to every executive in a metal-working industry today.

Steel plate . . . the fine type made at Barium's Central Iron and Steel Company . . . ready for shipment.

You'll do better ordering steel plate from Central, as well as Central stampings and fabrications.

Why? Because Central is part of Barium Steel Corporation . . . a team of companies supplying industry with steel in many forms, ready to work as a self-contained unit to speed urgently-needed orders.

Think of Barium as a single source for steel, controlling quality from blast furnace to finished product, and you'll want to do business with Barium. Address your needs in steel plate to Central Iron and Steel Company at 25 Broadway, New York City.



BOLTS — Bayonne Bolt Corporation

STEEL PLATE — Central Iron and Steel Company

PIG IRON — Chester Blast Furnace

CRANES AND HOISTS — Clyde Iron Works, Inc.

SPRINGS — Cuyahoga Spring Company

BOLTS AND NUTS — Erie Bolt and Nut Company

METAL STAMPINGS — Geometric Stamping Company

DROP FORGINGS — Globe Forge, Inc.

HEAVY FLAT DIE FORGINGS — Industrial Forge and Steel, Inc.

AIRCRAFT ENGINES AND PRECISION ASSEMBLIES — Jacobs Aircraft Engine Company

MARINE DIESEL AND GASOLINE ENGINES — Kermath Manufacturing Company, Kermath Limited (Canada)

STRUCTURAL SHAPES AND STEEL FABRICATIONS — Phoenix Bridge Company, Phoenix Iron and Steel Company

BARGES AND TUGS — Wiley Manufacturing Company

Market Briefs

Deliveries Halted—Metalworking firms have started to notify suppliers to stop shipments because of the steel strike. Even where steel stocks are still sufficient, scheduling headaches and customers' cutbacks have made halting of deliveries necessary. Suppliers are being told not to curtail raw materials procurement, however.

Steelworks-Union Agree—Bargaining agreement was reached last week between the Midvale Co., Nicetown, Pa., and the local AFL union. Under the agreement employees will receive a 12½¢ hourly increase across the board and other benefits generally in line with Wage Stabilization Board terms. When settlement is reached in the national steel strike, the wage clause will be reopened for negotiation of any additional wage increase over 12½¢ (not to exceed 2½¢ per hr) bargained by the major steel producers.

Raises Prices—Base prices on reinforcing bars, light structurals and small shapes were raised $5 per ton across the board by Pacific States Steel Co. of Niles, Calif, last week. Milo Spaech, vice-president in charge of sales, said there was "economic justification" and prices are still below ceiling. Firm is operating under a union contract.

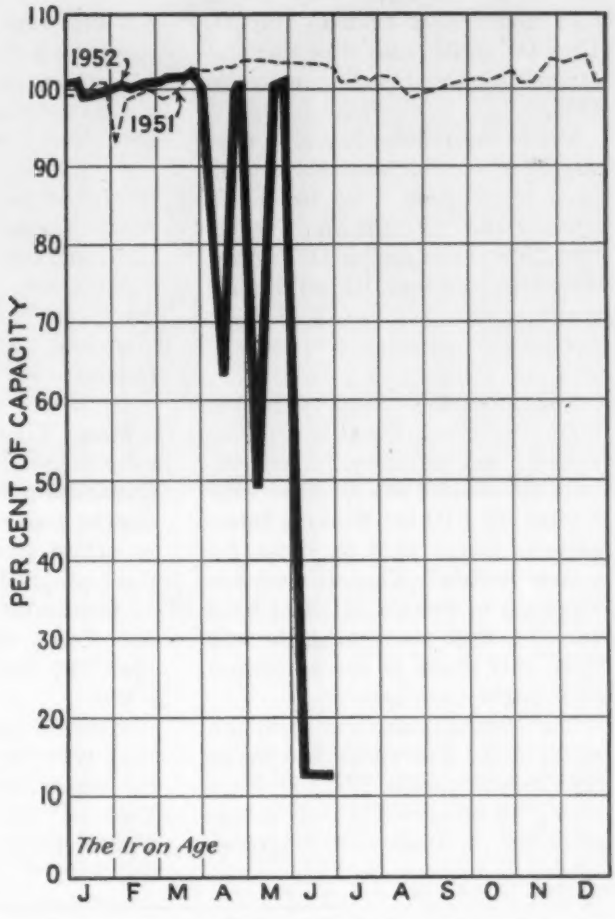
Business Off—Production in the Chicago area has taken a definite drop for the first time since December, and employee layoffs are reaching their highest figure in months, according to Chicago Assn. of Purchasing Agents. Deliveries are rapid, inventories are being pushed down, and backlogs are falling. Steelmen believe the strike will insure full order books into 1953, that selling in some lines would have been tough in the fourth quarter of this year, had the strike not hit.

MSA Grants—Holland has been given authority to use $3 million in Mutual Security Agency funds to purchase tinplate, terneplate and blackplate from the U. S. Austria has been authorized to spend $400,000 on U. S. blackplate and transformer sheets. France also has been granted more than $400,000 in MSA funds for construction, mining and related equipment.

Plastics Pushed—Defense Production Administration's office has set production goals for plastics at 4.6 billion lb by 1955—more than double 1950 output. Included in the 12 plastic categories are vinyl, styrene, silicone resins, cellulose plastics, and plastic type nylon.

Imported Copper—Office of Price Stabilization exempted from price control all sales of foreign primary copper and copper refined from imported ores, concentrates, and imported raw materials including scrap. Authorization is contained in Amendment 21 to General Overriding Reg. 9. The exemption is conditioned upon the maintenance of proper records subject to inspection by the OPS. The action revokes Supplementary Reg. 46 to the General Ceiling Price Regulation which set a ceiling price of 27½¢ a lb for sales of certain quantities of copper refined from imported raw materials. Also, it removes sales of foreign primary copper from the GCPR.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
June 15	3.0	7.5*	7.0	13.0	27.5*	0.5	0.0	30.0*	52.0*	3.5	33.0	30.0*	14.0	12.5*
June 22	3.0	7.5	7.0	14.5	27.5	0.5	0.0	40.0	52.0	3.5	36.7	22.0	14.0	12.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Low Zinc Demand Forces Price Cut

Steel strike killing demand for both zinc and tin . . . Zinc off 4½¢ since strike began . . . DPA shooting for 8 million ton bauxite goal . . . Labor trouble climbing—*By R. L. Hatschek.*

The steel strike is continuing to cut into the zinc market. Without any galvanizing demand, the zinc price took another 1¢ tumble last week bringing the price for Prime Western grade down to 15.00¢ per lb f.o.b. East St. Louis. That makes a total of 4½¢ knocked off the price since the beginning of the month. The previous price of 19.50¢ per lb held from Oct. 2, 1951, to May 31. Then the strike. Last time zinc was at this price was early September, 1950.

Prices on rolled zinc, zinc dust and other similar products are off as a result. Zinc scrap has taken another kick with the latest reduction. New dealer buying prices are: New zinc clippings, 8¢ per lb; old zinc, 6¢; zinc routings, 3 to 3½¢; and old die-cast scrap, 5 to 5½¢.

Smelter Strike—Reports are that negotiations have begun in the Texas City Smelters strike. The government tin smelter was closed on June 3 when the CIO Oil Workers International Union went on strike for a new contract. The old one was supposed to remain in effect until June 30. With tin demand the way it is, this strike is not as critical as it might have been.

Tin demand is also way down as a result of the steel strike. But under the Reconstruction Finance Corp. set-up the price could hardly do any dropping. London and Singapore markets are slightly lower with the latter closing at $1.18⅝ per lb last Friday. This is equivalent to $1.22⅛ c.i.f. New York.

Bauxite Boost — To keep pace with steadily expanding aluminum reduction facilities, Defense Production Administration has set a 1953 goal for bauxite production of 8 million long tons, dry basis. This compares with production of about 4.7 million tons in 1951.

This move lays the foundation for provision of government assistance for the expansion program. Major portion of the new expansion is already taking place in Jamaica, Haiti and Santo Domingo.

What may increase military demand for aluminum is a reinvigorated Air Force expansion program.

More Targets — DPA set two more figures for attainment by the aluminum industry: A $15 million interim goal for capital investment in welded aluminum tubing facilities and a $30 million private capital investment to go along with the Air Force heavy press program (See THE IRON AGE, Apr. 3, 1952, p. 85).

Ultimate goals in both cases are impossible to establish because of the experimental nature of both. Eventual requirements of both welded aluminum tubing and heavy forging and extrusion press capacity are intangibles for the moment.

Ingot Output—May shipments of ingot brass and bronze totaled 21,740 net tons, according to the Defense Council of the Ingot Brass and Bronze Industry. This is the lowest ebb of the current year, comparing with 22,547 tons in the previous month and 28,315-ton high established in January. Shipments have declined each month so far in 1952.

Copper Prices—The British Ministry of Materials has announced a copper price agreement with its suppliers. The new price is 33.00¢ per lb rather than being based on the E & MJ quotation. They consider that the current gyrations of the world copper price are highly abnormal—too abnormal to base a contract on. They aren't wrong about that. The 33.00¢ price is effective from June 12 to June 30.

A sale to the U. S. of 10,000 metric tons of Chilean copper was reported last week. The price was 35.50¢ per lb at port of shipment. The same report indicated that a sale of major tonnage was to take place this week.

Brass Strike—Late last Friday, the negotiations between Scovill Mfg. Co. and the United Auto Workers collapsed. A strike was then called for 7 o'clock Saturday morning. Over 5000 workers are involved. Despite the 11¢ per hour wage boost already granted, the issues were economic; retroactivity of the pay hike, an annual improvement factor, pensions, and an escalator clause.

American Brass Co. is blocked in reaching agreement with the same union by similar disputes. In this case the company wants a 5-year contract while the union prefers a 2-year arrangement. The retroactivity issue here is settled. But the 11¢ boost just isn't enough for a 5-year contract in the union's eyes. Nor is there any meeting of minds on the 4¢ annual improvement factor.

NONFERROUS METAL PRICES

	June 18	June 19	June 20	June 21	June 23	June 24
Copper, electro, conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	14.80	14.80	14.80	14.80	15.30	15.30

Note: Quotations are going prices.

"Never again will I buy anything of theirs!"

BEWARE the fury of a woman who finds she's been sold something with fasteners that stain fabrics . . . or leave a greasy "ghost-mark" . . . and also fail to live a useful life as long as that of the garment itself.

And who can blame her? Especially when she's the victim of *an unnecessary substitute for Brass.* For whether she knows those fasteners are Brass or not, she knows she has no trouble with them in any way! And neither do fastener manufacturers (or any other Brass-fabricators). For *there is no substitute for Brass* in ease of forming and annealing . . . or in freedom from "metallergies" like blistering.

Now what's all the shooting for? That's a question that ought to be asked much more often, when copper production is on the steady increase, both here and abroad, to an extent which recently prompted the world's largest producer to say this: "On the basis of the facts, there is no need to consider long-range substitution of other materials for the red metal". So whether you are a user or fabricator of Brass in anything from fasteners to refrigerators . . . *stand fast, and don't settle for less.* You'll get it, and sooner than you think.

The BRISTOL BRASS CORPORATION, makers of Brass since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means Brass at its Best

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.3¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.3¢.

Extruded Solid Shapes: shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.76.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅝ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. **Coiled Sheet:** 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	39.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.25
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	15.30
Lead, New York	15.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$195 to $198
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	82.75
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	15.00
Zinc, New York	15.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.40
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17¾
Red brass	20½	19¾
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅝	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18⅜—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14 —14¼
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	11½—12
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6 — 6½
Aluminum crankcases	7 — 7½
2S aluminum clippings	10
Old sheet and utensils	7 — 7½
Borings and turnings	5 — 6
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½

Zinc

New zinc clippings	8
Old zinc	6
Zinc routings	3 — 3½
Old die cast scrap	5 — 5½

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	11 —11¼
Battery plates (dry)	6¼— 7
Batteries, acid free	4 — 5

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100 —110
No. 1 pewter	70
No. 1 auto babbitt	55
Mixed common babbitt	13½—14
Solder joints	19 —20
Siphon tops	60
Small foundry type	18 —18½
Monotype	14½—15
Lino. and stereotype	12½—13
Electrotype	11 —11½
Hand picked type shells	8¾— 9
Lino. and stereo. dross	6
Electro. dross	5½

When Nobody Knows the Answer

One of these days you may come face-to-face with a metal problem that does not seem to have an answer.

That is the time to think of these International Nickel Company metallurgists. They are constantly improving and modifying nickel alloys to meet new conditions. They are always ready to help you with specific problems involving metals for aircraft use.

Over the past 50 years, Inco has developed a family of metals for hundreds of different applications. In one branch of the family, for example, is a group of heat-resisting alloys—Inconel®, Inconel "X"®, the Nimonics and Incoloy®— all now important in industry.

Elsewhere on the family tree, you will find other alloys — each with certain special characteristics. Often, there is a better-than-even chance that one of Inco's alloys offers exactly the properties you are looking for.

Of course, this does not mean that somebody at Inco can dip into the files and come up with a pat answer to every new problem. All the answers have not been found yet. But a tremendous amount of research has been done, and you can probably benefit in one way or another from it.

When nobody knows the answer, Inco's metallurgists keep going until they have investigated all possible metals and alloys that might do the job. In fact, the men in Inco's Technical Service (and in their Corrosion Engineering and High Temperature Engineering Services, as well) have one primary goal: to help you determine whether an Inco Nickel Alloy or some *other* metal will serve your purpose best.

No matter what your metal-selection problem may be, all the technical facilities of Inco are available to help you solve it. There is no charge, no obligation of any kind. For prompt technical help whenever you need information about metals, all you have to do is get in touch with: "Technical Service,"

THE INTERNATIONAL NICKEL CO., INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
NICKEL INCO ALLOYS

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL
"S"® MONEL • NICKEL • LOW CARBON NICKEL • DURANICKEL®
INCONEL® • INCONEL "X"® • INCOLOY® • NIMONICS

Openhearth Grades Slip Below Ceiling

Heavy melting, bundles forced down by steel strike . . . Some prices on offers to sell, others are distress sales by dealers trying to unload . . . Blast furnace grades still off.

A symptom of the strike-shattered scrap market was slipping of openhearth grades of scrap steel below ceiling in several districts. In some cases the ceiling fell on the basis of offers to sell. In others it was motivated by small sales to non-struck mills. Many of these were of the distress variety. Overloaded dealers had to get out from under.

Below-ceiling sales were reported in most areas for No. 1 and No. 2 heavy melting and in No. 2 bundles. Sales at any price throughout the country were few. Some dealers indicated they would try to ride out the strike, banking on a quick firming of the market when mills reopen.

Others were not so optimistic, pointing to good stocks already at the mills. Dealers' yards generally had high stockpiles, and some were curbing collections by lower payments.

There was some indication of a firming cast market, possibly reflecting a shortage of pig iron at foundries. Blast furnace grades continued their below-ceiling trend. Even where mills are accepting shipments rejections in all grades are high.

Pittsburgh — Openhearth grades dropped below ceiling this week on the basis of offers to sell. Substantial tonnage was involved in one offer, smaller tonnages in the others. There were no immediate takers. From a practical standpoint openhearth material was on a delivered price basis, even though little if anything is being laid down by consumers. Consensus is the market is off a minimum of $2 per ton. Short turnings dropped $2, on appraisal, to $33 delivered. Cast grades were firming.

Chicago—Scrap continued to move in small shipments here last week. Industrial scrap collection had fallen off, but a number of dealers reported full yards. The few who had been laying down scrap were accepting only small amounts. At the dealer level, scrap was being exchanged at falling prices. Few consumers were accepting scrap and steel grades moved very slowly.

Philadelphia — Steelmaking grades here dropped $4 to $8 per ton last week. Reason, of course, was the low level of activity resulting from the steel strike. Blast furnace grades were also lower. The larger, strike-bound consumers have thus far made no attempt to buy at the lower prices. Feeling in the trade is that such a cut in scrap prices would be another arrow for the strikers in their attempt to gain higher wages. Some believe reduced prices will not hold very long after the strike's end.

New York—On the basis of small sales to Pennsylvania steel plants, prices of No. 1 heavy, No. 2 heavy, and No. 2 bundles skidded below ceilings this week. These sales were of a distress nature by some dealers who could not afford to store. Other dealers said they would not sell at drastically reduced prices but would bide their time till the market came to life again.

Detroit—In contrast to other districts, No. 1 bundles and No. 1 heavy melting are still going at ceiling in Detroit. Only real softness is the continuing off market in cast and in blast furnace grades 7, 8 and 10. Brokers and a buyer for an operating mill agree that heavy melting is actually not easy to get.

Cleveland—Scrap market in Cleveland and the Valley is at a virtual standstill with no mills operating in these districts. Appraisal of market factors based on broker offerings to sell indicate market on dealer scrap, including No. 2 heavy melting steel and No. 2 bundles, is off $2 to $3 per gross ton. Demand for good industrial scrap is expected to hold but dealer material may be depressed for 30 to 60 days following resumption of steelmaking operations.

St. Louis—Steel mills in the St. Louis District are buying no scrap and say they will not during the steel strike. Mills not affected by the strike are accepting shipments against commitments made earlier, but strike-bound plants have held up shipments for the present. Prices of No. 1 and No. 2 heavy melting steel are expected to hold but a decline of around $2 a ton on bundles is held likely. All contracts expired with the end of the 45-day period at midnight June 23.

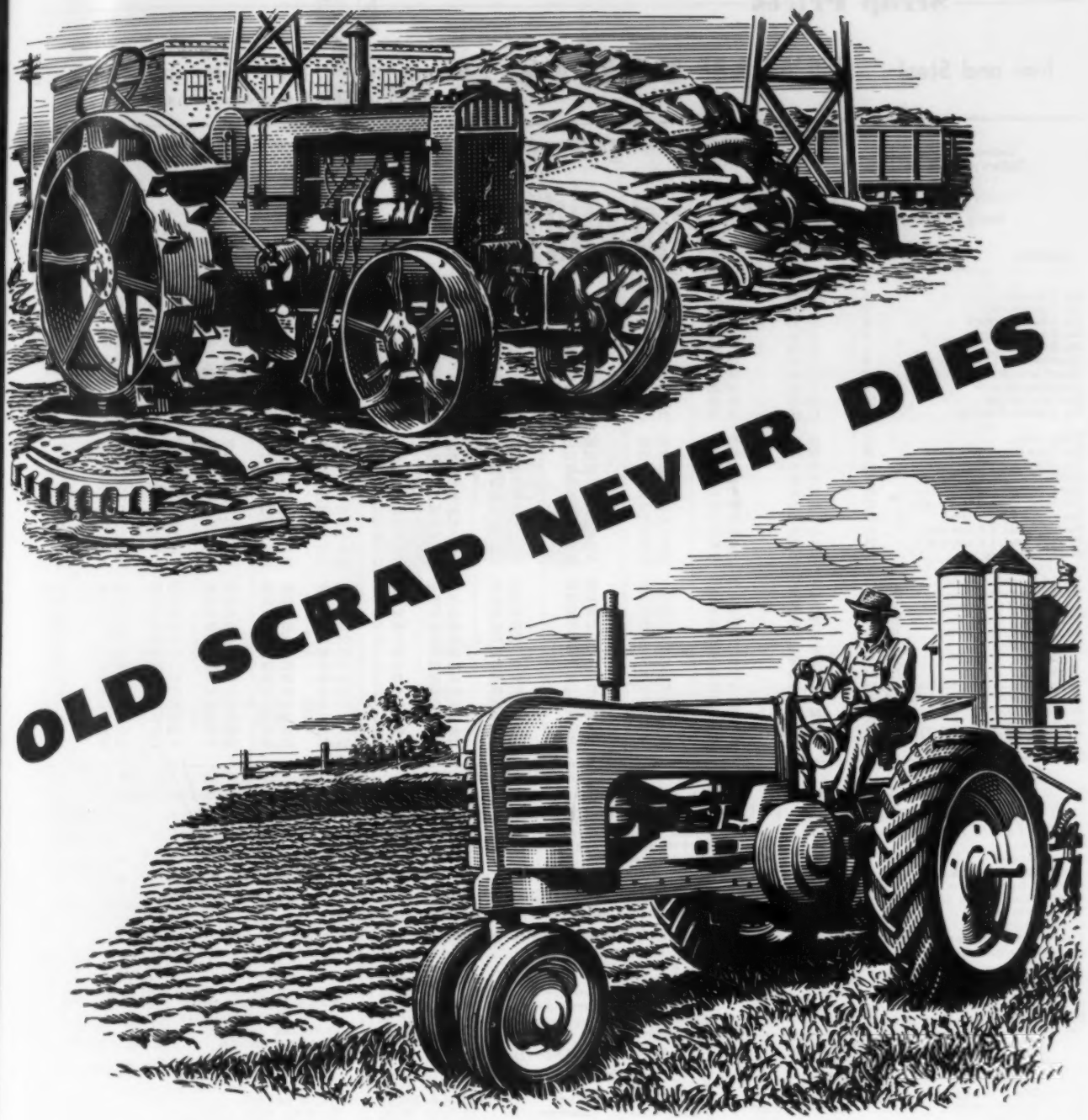
Birmingham — The cast market picked up a little here this week. Prices were unchanged. Some electric furnace scrap also is moving. Dealers' yards are pretty well filled. Some dealers report they have cut prices and this has reduced the amount coming in. Some dealers are worried about the prices mills will pay when they reopen, for they have a lot of scrap on hand. And for some of it they paid top prices.

Cincinnati — Market for turnings here has fallen off with these grades going at ceiling prices delivered. Openhearth grades—No. 2 steel and No. 2 bundles—are showing further weakness. One consumer formerly paying ceiling prices plus $3 per gross ton is expected to drop springboards and freight this week. Another buyer was able to pick up small tonnage of No. 2 steel and bundles at ceiling prices delivered.

Boston—Although it was difficult to pinpoint specific below-ceiling prices on steelmaking scrap, the trend was definitely down. It was clear that No. 1 heavy melting, No. 2 heavy and No. 1 bundles had slipped $2 below ceiling. Below ceiling sales when the strike ended were also anticipated.

West Coast—Scrap dealers in the Los Angeles and Seattle areas have laid off a good percentage of their workers. Some plants are in production but they are working principally off stockpiles at present. In the San Francisco area dealers are not quite so desperate because local producers are buying enough to justify staying open for business.

Buffalo—There was a pronounced weakness to the scrap market this week. In sympathy prices registered sharp drops. Steelmaking grades plunged nominally $5 a ton while blast furnace grades slipped $6 from ceiling levels. No sales to mills were reported.



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CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

GRADES	OPS No.	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.75	.51	.51	.75	.70	.76	.53	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.86	.50	.78	.50	.43	.51	.33	.57	.86	.65	.52	.86	.68
Basing Points →																																									
No. 1 bundles	1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$41.15	$40.00	$39.50	$39.00			$38.00	$37.00	$35.00				
No. 1 busheling	2	44.00							44.00					43.00				42.50						42.00					41.00	51.15	40.00	39.50	39.00			38.00	37.00	35.00				
No. 1 heavy melting	3	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00			37.00	36.00	34.00				
No. 2 heavy melting	4	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00			37.00	36.00	34.00				
No. 2 bundles	5	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00			37.00	36.00	34.00				
Machine shop turnings	6	34.00							34.00					33.00				32.50						32.00					31.00	31.15	30.00	29.50	29.00			28.00	27.00	25.00				
Mixed borings and turnings	7	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00	29.00				
Shoveling turnings	8	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00	29.00				
Cast iron borings	10	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00	29.00				
No. 1 chemical borings	26	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00			35.00	34.00	32.00				
Forge crops	11	51.50							51.50					50.50				50.00						49.50					48.50	48.65	47.50	47.00	46.50			45.50	44.50	42.50				
Bar crops and plate	12	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00	40.00				
Punchings and plate	14	46.50							46.50					45.50				45.00						44.50					43.50	43.65	42.50	42.00	41.50			40.50	39.50	37.50				
Electric furnace bundles	15	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00	37.00				
Cut struc. plate 3 ft and less	16	47.00							47.00					46.00				45.50						45.00					44.00	44.15	43.00	42.50	42.00			41.00	40.00	38.00				
Cut struc. plate, 2 ft and less	17	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00	40.00				
Cut struc., 1 ft and less	18	50.00							50.00					49.00				48.50						48.00					47.00	47.15	46.00	45.50	45.00			44.00	43.00	41.00				
Foundry steel, 2 ft and less	20	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00			38.00	37.00	35.00				
Foundry steel, 1 ft and less	21	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00	37.00				
Heavy trimmings	24	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00			37.00	36.00	34.00				
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00	37.00				
Scrap rails, random lengths	RR 14	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00			42.00	41.00	39.00				
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00	42.00				
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00				50.50						50.00					49.00	49.15	48.00	47.50	47.00			46.00	45.00	43.00				
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00				52.50						52.00					51.00	51.15	50.00	49.50	49.00			48.00	47.00	45.00				
Rerolling rails	RR 15	53.00							53.00					52.00				51.50						51.00					50.00	50.15	49.00	48.50	48.00			47.00	46.00	44.00				
Uncut tires	RR 20	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00			42.00	41.00	39.00				
Cut tires	RR 21	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00	42.00				
Cut bolsters and side frames	RR 23	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00	40.00				
RR specialties	RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00	42.00				
Solid steel axles	RR 25	58.00							58.00					57.00				56.50						56.00					55.00	55.15	54.00	53.50	53.00			52.00	51.00	49.00				
No. 3 steel wheels	RR 27	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00	42.00				
Unassorted	RR 35	40.00							40.00					39.00				38.50						38.00					37.00	37.15	36.00	35.50	35.00			34.00	33.00	31.00				

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Below-Ceiling Prices

PITTSBURGH (Delivered)

No. 1 heavy melting	$42.00 to $43.00
No. 2 heavy melting	42.00 to 43.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	42.00 to 43.00
Drop broken mach'y cast	52.50 to 53.00
Cupola cast	45.00 to 46.00
Charging box cast	47.00
Heavy breakable	45.50 to 46.00
Machine shop turnings	29.00
Mixed borings, turnings	33.00
Shoveling turnings	33.00
Cast iron borings	33.00

CHICAGO (Delivered)

No. 1 heavy melting	$38.00 to $39.00
No. 2 heavy melting	38.00 to 39.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	38.00 to 39.00
Cupola cast	40.00 to 41.00
Stove plate	34.00 to 35.00
Heavy breakable	35.00 to 36.00
Drop broken machinery	43.00 to 44.00
Unstripped motor blocks	33.00 to 34.00
Charging box cast	39.00 to 40.00
Clean auto cast	42.00 to 43.00
Malleable	50.00 to 51.00
Machine shop turnings	26.00 to 27.00
Mixed borings, turnings	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00

PHILADELPHIA (Delivered)

No. 1 heavy melting	$37.00 to $38.00
No. 2 heavy melting	35.00 to 36.00
No. 1 busheling	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	33.00 to 34.00
Machine shop turnings	27.00 to 28.00
Mixed borings, turnings	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cupola cast	38.00 to 39.00
Heavy breakable	41.00 to 42.00
Clean auto cast	45.00 to 46.00
Unstripped motor blocks	34.00 to 35.00
Charging box cast	40.00 to 41.00

YOUNGSTOWN (Delivered)

No. 1 heavy melting	$42.00 to $43.00
No. 2 heavy melting	42.00 to 43.00
No. 2 bundles	42.00 to 43.00
Machine shop turnings	29.00 to 30.00
Mixed borings, turnings	33.00 to 35.00
Shoveling turnings	33.00 to 35.00
Cast iron borings	33.00 to 35.00

CLEVELAND (Delivered)

No. 2 heavy melting	$41.00 to $42.00
No. 2 bundles	41.00 to 42.00
Machine shop turnings	$29.00 to $30.00
Mixed borings, turnings	33.00 to 35.00
Shoveling turnings	33.00 to 35.00
Cast iron borings	33.00 to 35.00
Unstripped motor blocks	38.00 to 39.00
Cupola cast	45.00 to 46.00
Heavy breakable	39.00 to 40.00
Drop broken machinery	50.00 to 51.00

BIRMINGHAM (Delivered)

Cupola cast	$40.00 to $41.00
Stove plate	36.00 to 37.00
Charging box cast	39.00 to 40.00
Heavy breakable	36.00 to 37.00
Drop broken machinery	42.00 to 43.00
Unstripped motor blocks	35.00 to 36.00

ST. LOUIS (Delivered)

Heavy breakable	$45.00
Stove plate	42.00
Mixed borings, turnings	33.00

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	$35.00
No. 2 heavy melting	34.00
No. 2 bundles	33.00
Machine shop turnings	25.00
Mixed borings, turnings	27.00
Shoveling turnings	27.00
Drop broken machinery	$36.00 to 38.00
Mixed yard cast	34.00 to 35.00
Charging box cast	36.00 to 38.00
Heavy breakable	34.00 to 35.00
Unstripped motor blocks	30.00 to 31.00

BOSTON (Brokers' buying prices)

No. 1 heavy melting	$31.00 to $32.00
No. 2 heavy melting	30.00 to 31.00
No. 1 bundles	32.00 to 33.00
Cupola cast	32.00
Stove plate	31.00 to 33.00
Heavy breakable	32.00

DETROIT (Brokers' buying prices)

Cupola cast	$46.00
Charging box	45.00
Heavy breakable	43.00
Cast iron brake shoes	39.00
Stove plate	44.00
Drop broken machinery cast	50.00
Machine shop turnings	$25.00 to 26.00
Mixed boring and turnings	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00

CINCINNATI (Delivered)

No. 2 heavy melting	$42.00
No. 2 bundles	42.00
Machine shop turnings	$32.00 to 33.00
Mixed boring, turnings	36.00 to 37.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Stove plate	45.00
Clean auto cast	47.00

BUFFALO (Delivered)

No. 1 bundles	$38.00 to $39.00
No. 2 busheling	38.00 to 39.00
No. 1 heavy melting	37.00 to 38.00
No. 2 heavy melting	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
Cupola cast	40.00 to 41.00
Machine shop turnings	28.00 to 29.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00

SAN FRANCISCO (Delivered)

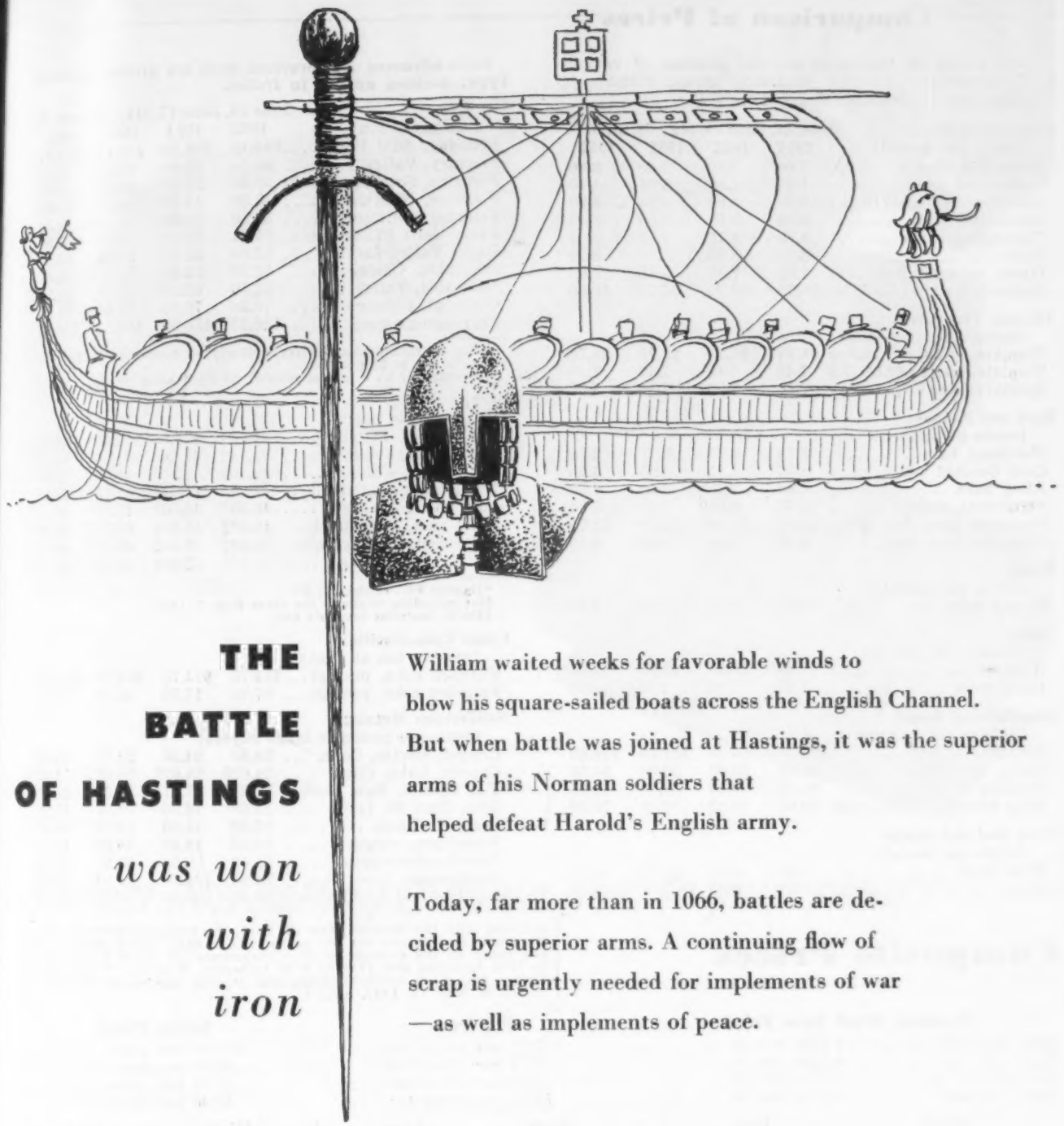
Cupola cast	$42.00
No. 2 bundles	29.00
Machine shop turnings	20.00

LOS ANGELES (Delivered)

Cupola cast	$46.00
No. 2 bundles	29.00
Machine shop turnings	20.00

SEATTLE (Delivered)

Cupola cast	$36.50
Heavy breakable	32.00
No. 2 bundles	29.00



THE BATTLE OF HASTINGS *was won with iron*

William waited weeks for favorable winds to blow his square-sailed boats across the English Channel. But when battle was joined at Hastings, it was the superior arms of his Norman soldiers that helped defeat Harold's English army.

Today, far more than in 1066, battles are decided by superior arms. A continuing flow of scrap is urgently needed for implements of war —as well as implements of peace.

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Flat-Rolled Steel: (cents per pound)	June 24, 1952	June 17, 1952	May 27, 1952	June 26, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No.302)	36.75	36.75	36.75	36.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Pig Iron: (per gross ton)	June 24, 1952	June 17, 1952	May 27, 1952	June 26, 1951
Foundry, del'd Phila.	$58.19	$58.19	$58.19	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.27	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$42.50*‡	$43.00*	43.00*	$44.00*
No. 1 steel, Phila. area	*37.50*‡	41.50*	41.50*	42.50*
No. 1 steel, Chicago	*38.50*‡	41.50*	41.50*	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos., Young'n	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	45.50‡	45.50‡	45.50‡	49.00†
No. 1 cast, Philadelphia	38.50‡	38.50‡	40.50‡	49.00†
No. 1 cast, Chicago	*40.50*‡	42.00‡	43.50‡	49.00†

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.
‡Del'd, includes broker's fee.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	$1.06
Zinc, East St. Louis	*15.00*	16.00	19.50	17.50
Lead, St. Louis	15.30	14.80	14.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)]

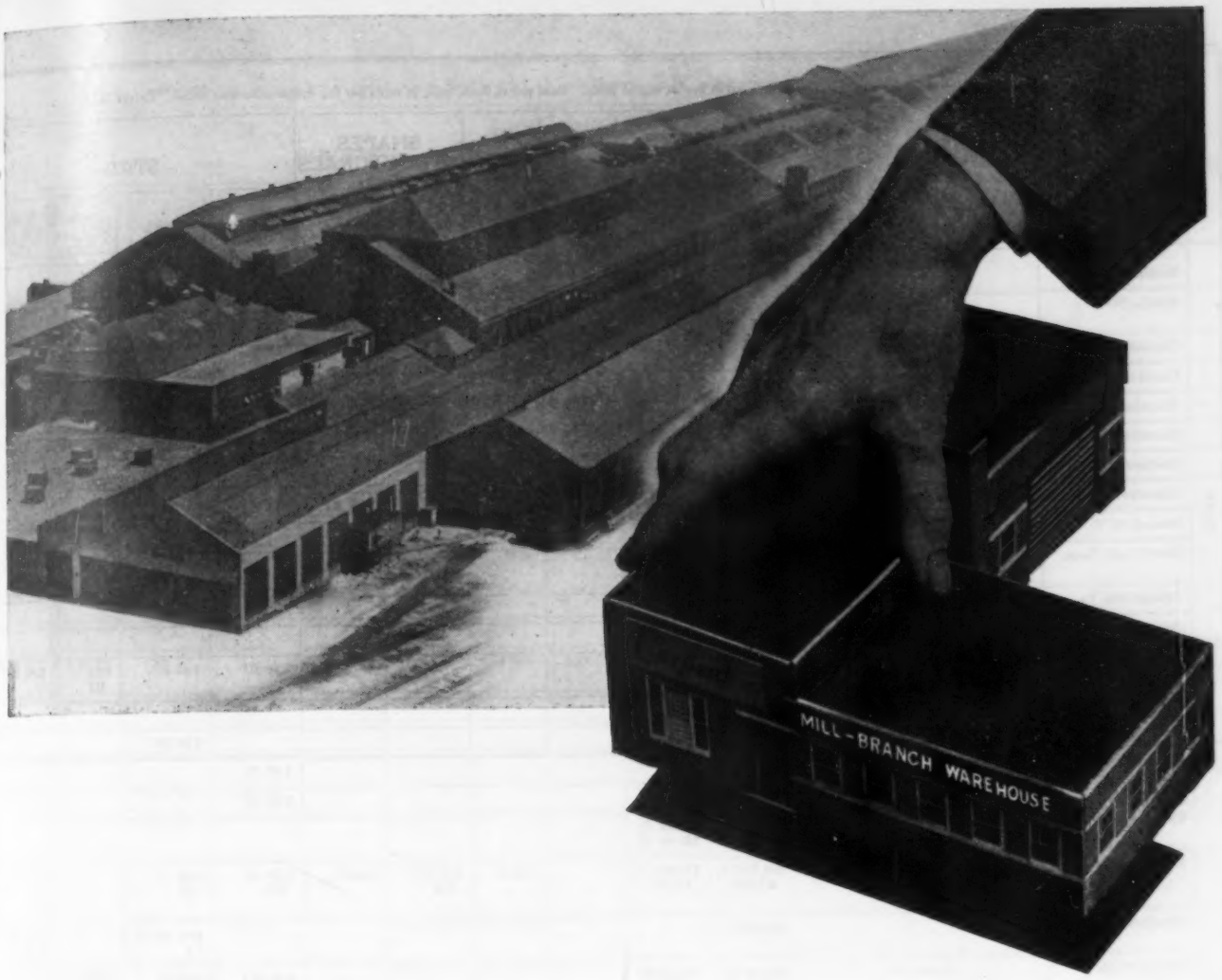
	Finished Steel Base Price	Pig Iron	Scrap Steel
June 24, 1952	4.131¢ per lb.	$52.77 per gross ton	*$39.50* per gross ton
One week ago	4.131¢ per lb.	52.77 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.77 per gross ton	42.00 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1952	4.131¢ Jan. 1	4.131¢ Jan. 1	$52.77 May 2	$52.72 Jan. 1	$42.00 Jan. 1	$39.50 June 24
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	52.72 Oct. 9	52.69 Jan. 2	47.75 Jan. 30	42.00 Oct. 23
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$18.92 May 22
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.27207¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.



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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$70.00 *B3*			3.70 *B3*	5.50 *B3*				
	Buffalo, N. Y.			$56.00 *B3*	$66.00 *B3, R3*	$70.00 *B3, R3*		4.45 *B3*	3.70 *B3*	5.50 *B3*	3.50 *B3, R3*	4.85 *B3*	4.95 *B3*	6.40 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$73.00 *A2*	$77.00 *A2*					3.90 *A2*		5.55 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$56.00 *B3*	$66.00 *B3*	$70.00 *B3*			3.70 *B3*	5.50 *B3*	3.50 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.15 *A5* 5.85 *D1*		
	Phoenixville, Pa.								5.90 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 *B3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.00 *R4*		
MIDDLE WEST	Alton, Ill.										3.95 *L1*			
	Ashland, Ky.										3.50 *A7*			
	Canton-Massillon				$66.00 *R3*	$70.00 *R3* $66.00 *T5*								
	Chicago, Ill.			$56.00 *U1*	$66.00 *U1, R3,W8*	$70.00 *U1, R3,W8*		4.45 *U1*	3.65 *U1, W8*	5.50 *U1*	3.50 *A1, W8*	4.90 *A1, I3*		
	Cleveland, Ohio				$66.00 *R3*							4.65 *A5, J3*		6.55 *A5* 6.70 *J3*
	Detroit, Mich.		$54.00 *R5*		$69.00 *R5*	$73.00 *R5*					4.40 *M2* 3.80 *G3*	4.85 *G3* 5.45 *M2* 5.60 *R5, D1*	5.95 *G3*	
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$56.00 *U1*	$66.00 *U1*	$70.00 *U1, Y1*		4.45 *I3*	3.65 *U1, I3*	5.50 *U1, I3* 6.00 *Y1*	3.50 *U1, Y1, I3*	4.90 *I3*	5.30 *U1, I3* 5.80 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											4.65 *A7*		
	Niles, Ohio Sharon, Pa.										4.00 *S1*	5.35 *S1*	5.40 *S1*	6.55 *S1*
	Pittsburgh, Pa.	$52.00 *U1*	$54.00 *U1, C11*	$56.00 *U1*	$66.00 *U1*	$70.00 *U1, C11*	3.35 *U1* 3.45 *J3*	4.45 *U1*	3.65 *U1, J3*	5.50 *U1, J3*	4.00 *S9,S7* 3.75 *A3* 3.50 *J3, A7*	4.65 *J3, A7* 5.00 *A3* 5.35 *B4, S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								3.90 *W3*		3.60 *W3*	4.65 *W3, F3*	5.75 *W3*	7.20 *W3*
	Youngstown, Ohio					$70.00 *Y1, C10*	3.35 *U1, R3*			6.00 *Y1*	3.50 *U1, R3, Y1*	4.65 *R3, Y1* 5.25 *C5, T4* 5.35 *B4*	5.30 *U1, R3* 5.80 *Y1*	6.55 *R3* 7.05 *Y1*
WEST	Fontana, Cal.	$79.00 *K1*	$80.00 *K1*	$75.00 *K1*	$85.00 *K1*	$89.00 *K1*			4.25 *K1*	6.10 *K1*	4.75 *K1*	6.30 *K1*	6.20 *K1*	6.95 *K1*
	Geneva, Utah				$66.00 *C7*				3.65 *C7*	5.50 *C7*				
	Kansas City, Mo.								4.25 *S2*		4.10 *S2*			
	Los Angeles, Calif.				$85.00 *B2*	$90.00 *B2*			4.25 *B2, C7*	6.05 *B2*	4.25 *B2,C7*	6.40 *C1*	6.05 *B2*	
	Minnequa, Colo.								4.10 *C6*		4.55 *C6*			
	San Francisco, Cal.				$85.00 *B2*				4.20 *B2*	6.00 *B2*	4.25 *C7, B2*		6.05 *B2*	
	Seattle, Wash.	$73.00 *S11*			$85.00 *B2*				4.30 *B2*	6.10 *B2*	4.50 *B2*		6.30 *B2*	
SOUTH	Atlanta, Ga.										4.05 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$56.00 *T2*	$66.00 *T2*				3.65 *R3, T2*	5.50 *T2*	3.50 *R3, T2*		5.30 *T2*	
	Houston, Texas		$62.00 *S2*		$74.00 *S2*	$78.00 *S2*			4.05 *S2*		3.90 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
3.60 *B3*	4.35 *B3*				5.40 *B3*	6.55 *B3*			4.10 *W6*				Buffalo, N. Y.
										† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb, deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb, add 25¢; 0.75-lb, add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.00 *A2*					5.65 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.10 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.60 *B3*	4.35 *B3*	4.80 *B3*			5.40 *B3*	6.55 *B3*	6.75 *B3*		4.20 *B3*	$8.55 *B3*	$7.25 *B3*		Sparrows Pt., Md.
									4.40 *A5*				Worcester, Mass.
									4.20 *R4*				Trenton, N. J.
									4.40 *L1*				Alton, Ill.
3.60 *A7*		4.80 *A7*	4.65 *A7*										Ashland, Ky.
		4.80 *R3*											Canton-Massillon
3.60 *W8*					5.40 *U1*				4.10 *A5,R3, N4*				Chicago, Ill.
3.60 *R3,J3*	4.35 *R3,J3*		4.65 *R3*		5.40 *R3,J3*	6.55 *R3,J3*			4.10 *A5*				Cleveland, Ohio
3.80 *G3* 4.40 *M3*	4.55 *G3*				5.95 *G3*	7.10 *G3*							Detroit, Mich.
													Duluth, Minn.
3.60 *U1, Y1,I3*	4.35 *U1, Y1,I3*	4.80 *U1,I3*	4.65 *U1,I3*	5.20 *U1*	5.40 *U1,I3* 5.90 *Y1*	6.55 *U1,I3* 7.05 *Y1*		5.40 *I3*	4.10 *Y1*	$8.45 *B3, U1, Y1*	$7.15 *U1,I3*	5.85 *U1* 5.30 *Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.05 *G2*	5.50 *G2*	5.35 *G2*								$7.35 *G2*	6.05 *G2*	Granite City, Ill.
		5.20 *C9*											Kokomo, Ind.
	4.35 *A7*		4.65 *A7*	5.20 *A7*									Middletown, Ohio
5.25 *N3* 4.06 *S1*		6.00 *N3*		6.00 *N3*	5.40 *S1*								Niles, Ohio Sharon, Pa.
3.60 *U1, J3,A7* 3.75 *A3*	4.35 *U1, J3,A7*	4.80 *U1*	4.65 *U1*		5.40 *U1,J3*	6.55 *U1,J3*	7.20 *U1*		4.10 *A5* 4.30 *P6*	$8.45 *U1,J3*	$7.15 *U1,J3*	5.85 *U1*	Pittsburgh, Pa.
									4.30 *P7*				Portsmouth, Ohio
3.60 *W3,W5*	5.35 *F3* 4.35 *W3,W5*	4.80 *W3,W5*		5.20 *W3,W5*	5.75 *W3*	6.90 *W3*				$8.45 *W3,W5*	$7.15 *W3,W5*	6.15 *W5* 5.85 *F3*	Weirton, Wheeling, Follansbee, W. Va.
3.60 *U1, R3, Y1*	4.35 *R3, Y1*	5.50 *R1*	4.65 *Y1*	6.05 *E2*	5.40 *U1,R3* 5.90 *Y1*	6.55 *R3* 7.05 *Y1*		6.05 *R1,E2*	4.10 *Y1*	$8.45 *R3*	$7.15 *R3*		Youngstown, Ohio
4.55 *K1*	5.30 *K1*				6.35 *K1*	7.50 *K1*			4.90 *K1*				Fontana, Cal.
3.70 *C7*													Geneva, Utah
													Kansas City, Mo.
4.30 *C7*		5.55 *C7*						5.40 *C7*	4.90 *B2,C7*	$9.20 *C7*	$7.90 *C7*		Los Angeles, Cal.
									4.35 *C6*				Minnequa, Colo.
4.30 *C7*	5.30 *C7*	5.55 *C7*											San Francisco, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.60 *R3,T2*	4.35 *T2*	4.80 *R3,T2*			5.40 *T2*			4.75 *R3*	4.10 *R3,T2*	$8.55 *T2*	$7.25 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.50 *S2*				Houston, Texas

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'n. Bright
EAST	Bethlehem, Pa.				4.30 *B3*	5.40 *B3*	5.55 *B3*					
	Buffalo, N. Y.	3.70 *B3,R3*	3.70 *B3,R3*	4.60 *B5*	4.30 *B3,R3*	5.40 *B3*	5.55 *B3*	3.70 *B3*				4.85 *W6*
	Claymont, Del.							4.15 *C4*		4.85 *C4*		
	Coatesville, Pa.							4.15 *L4*		5.25 *L4*		
	Conshohocken, Pa.							4.15 *A2*	4.75 *A2*	5.05 *A2*	5.90 *A2*	
	Harrisburg, Pa.							6.30 *C3*	6.30 *C3*			
	Hartford, Conn.			5.10 *R3*		5.85 *R3*						
	Johnstown, Pa.	3.70 *B3*	3.70 *B3*		4.30 *B3*		5.55 *B3*	3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Newark, N. J.			5.00 *W10*		5.75 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 *W10*								
	Sparrows Point, Md.		3.70 *B3*					3.70 *B3*		4.75 *B3*	5.05 *B3*	4.95 *B3*
	Worcester, Mass.					5.75 *A5*						5.15 *A5,W6*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.15 *L1*										5.05 *L1*
	Ashland, Ky.							3.70 *A7*				
	Canton-Massillon	3.70 *R3*		4.55 *R3,R2*	3.95 *T5* 4.30 *R3*	4.90 *T5* 5.40 *R3,R2*						
	Chicago, Ill.	3.70 *U1, R3, W8*	3.70 *R3*	4.55 *A5,B5, W8,W1*	4.30 *U1,R3 W8*	5.40 *R3,W8 W10,B5,L2* 5.45 *A5*		3.70 *U1,W8*	4.75 *U1*	4.75 *U1*	5.65 *U1*	5.10 *W7* 4.85 *R3,A5, K2,N4*
	Cleveland, Ohio	3.70 *R3*	3.70 *R3*	4.55 *A5,C13*		5.45 *A5*	5.55 *R3,J3*	3.70 *R3,J3*	4.75 *J3*		5.05 *R3,J3*	4.85 *A5,C13*
	Detroit, Mich.	3.85 *R5*		4.70 *P8,R5* 4.80 *P3*	4.45 *R5* 4.65 *G3*	5.50 *R5* 5.55 *P8* 5.60 *P3*						
	Duluth, Minn.											4.85 *A5*
	Gary Ind. Harbor Indiana	3.70 *U1, Y1, I3*	3.70 *U1,I3, Y1*	4.55 *R3,M5, L2*	4.30 *U1,I3, Y1*	5.40 *R3,M5, L2*	5.55 *U1,I3* 6.05 *Y1*	3.70 *U1,I3, Y1*	4.75 *I3*	4.75 *U1*	5.65 *U1,I3* 6.15 *Y1*	5.10 *M4*
	Granite City, Ill.							4.40 *G2*				
	Kokomo, Ind.											4.95 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 *S1*		5.20 *S1*	5.70 *S1*	
	Pittsburgh, Pa.	3.70 *U1,J3*	3.70 *U1,J3*	4.55 *R3,A5, J3,S8,W10, C8*	4.30 *U1,C11*	5.40 *C11,S8, W10,C8,A5*	5.55 *U1,J3*	3.70 *U1,J3*	4.75 *U1*	4.75 *U1*	5.65 *U1,J3*	4.85 *A5,J3* 5.10 *P6*
	Portsmouth, Ohio											5.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	3.85 *W3*						4.00 *W3,W5*				
	Youngstown, Ohio	3.70 *U1,R3, Y1*	3.70 *U1,R3, Y1*	4.55 *Y1,F2*	4.30 *U1, Y1, C10*	5.40 *Y1,C10, F2*	5.55 *U1* 6.05 *Y1*	3.70 *U1,R3, Y1*			5.65 *R3* 6.15 *Y1*	4.85 *Y1*
WEST	Fontana, Cal.	4.40 *K1*	4.40 *K1*		5.35 *K1*		6.60 *K1*	4.30 *K1*		5.70 *K1*	6.25 *K1*	
	Geneva, Utah							3.70 *C7*			5.65 *C7*	
	Kansas City, Mo.	4.30 *S2*	4.30 *S2*		4.90 *S2*							5.45 *S2*
	Los Angeles, Cal.	4.40 *C7,B2*	4.40 *C7,B2*		5.35 *B2*		6.25 *B2*					5.80 *C7,B2*
	Minnequa, Colo.	4.15 *C6*	4.50 *C6*					4.50 *C6*				5.10 *C6*
	San Francisco, Cal.	4.45 *B2* 4.40 *C7*	4.45 *B2* 4.40 *C7*				6.30 *B2*					5.00 *C7*
	Seattle, Wash.	4.45 *B2*	4.45 *B2*				6.30 *B2*	4.60 *B2*			6.55 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.10 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.70 *R3,T2*	3.70 *R3,T2*				5.55 *T2*	3.70 *R3,T2*			5.65 *T2*	4.85 *R3,T2*
	Houston, Tex.	4.10 *S2*	4.10 *S2*		4.70 *S2*			4.10 *S2*				5.25 *S2*

Key to Steel Producers

With Principal Offices

A2 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Steel Corp., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLauth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal, Iron & R. R. Co., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Co., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

Steel Prices

Base price, f.o.b., dollars per 100 lb.

WAREHOUSES		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
Cities	Delivery Charge*	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As Rolled	Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.54–6.44	6.80–7.05	8.20	6.03	.....	6.13	6.13	6.01	6.63	.....	.....	.....	.....
Birmingham	.15	5.59	6.37	7.20–7.35[1]	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	.20	6.25	7.03	8.33	6.15–6.20	7.74–8.70	6.38–6.63	6.20–6.25	6.05–6.14	6.61–6.92	10.25–10.30	10.55–10.63	11.95	12.15–12.28
Buffalo	.20	5.50–5.54	6.28–6.32	8.11–8.20	5.86–.....	.....	5.89–5.98	5.80–5.82	5.52–5.55	6.18–6.45	10.15	10.45–10.52	11.80	12.10–12.17
Chicago	.20	5.54	6.32	7.70	5.49	.....	5.65–5.70	5.65	5.47	6.05–6.30	.....	10.10	.....	11.75
Cincinnati	.15	5.87	6.39	8.17	5.79	.....	6.17	6.12	5.77	6.66	.....	10.52	.....	12.22
Cleveland	.20	5.54	6.32	7.83–7.96	5.65	.....	5.82–5.95	5.95–5.98	5.77–5.95	6.15–6.40	.....	10.21	.....	11.86
Detroit	.20	5.74	6.49	8.34	5.78	.....	6.17	6.12	5.76	6.60	.....	10.37	.....	12.12
Houston	.20	6.35–6.58	7.37–8.09	8.57	6.15	.....	6.39–6.42	6.32–6.35	6.38	8.38–8.63	10.95	11.12–11.25	11.40	12.62–12.90
Indianapolis	del'd.	5.94	6.72	8.25	5.89	.....	6.10	6.05	5.87	6.80	.....	10.50	.....	.....
Kansas City	.20	6.22–6.40	7.64–7.68	8.66–8.70	6.10–6.90	7.81	6.38–6.74	6.43–6.48	6.20–6.77	7.01–7.22	10.00	10.10	11.50	11.80
Los Angeles	.20	6.30	8.10–8.45	9.30–9.35	6.40	10.45	6.30	6.30	6.25–6.35	8.15	11.30	11.30	13.05	13.50
Memphis	.10	6.25	7.03	7.51	6.20	.....	6.36	6.36–6.61	6.33–6.57	7.11	.....	.....	.....	.....
Milwaukee	.20	5.71	6.48	7.87	5.66	.....	5.81–5.87	5.82	5.64	6.31–6.61	.....	10.17	.....	.....
New Orleans	.15	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....	.....	.....
New York	.30	6.09–6.52	6.90–6.91	8.12–8.45	6.36–7.19	7.67	6.46–6.88	6.08–6.40	6.22–6.42	7.03–7.13	10.45	10.49–10.75	12.10	12.14–12.40
Norfolk	.20	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....	.....	.....
Philadelphia	.25	5.84–6.07	6.80–7.22	7.99–8.38	6.04–6.08	7.15	6.05–6.19	5.86–6.09	6.14–6.27	6.96–7.16	9.82–10.17	10.24–10.47	11.82	11.89–12.12
Pittsburgh	.20	5.54	6.32	7.85–8.10	5.59–5.84	.....	5.65–5.70	5.65	5.47	6.15–6.40	.....	10.10	.....	11.75
Portland	.20	7.25	8.64	9.10–9.00	7.30	.....	6.80	7.19	7.00	8.65	.....	.....	.....	.....
Salt Lake City	.20	7.95	.....	9.80–9.25	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco	.15	6.51–6.65	7.88–8.23	10.35–9.10	6.42	10.45	6.40–6.43	6.30	6.32–6.34	8.15–8.20	11.30	11.30	13.05	13.50
Seattle	.20	6.14–6.81	8.38–8.44	8.93	7.05–7.75	.....	6.71–6.90	6.32–6.57	6.50–6.80	8.89–8.93	.....	.....	.....	.....
St. Louis	.20	5.73–5.84	6.62–7.15	8.00	5.77–5.79	7.66–8.15	6.02–6.10	6.05–6.22	5.77–5.80	6.43–6.70	10.08	10.40	11.73	12.05
St. Paul	.15	6.14	6.92	8.45	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

* Metropolitan area delivery.

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.
EXCEPTIONS: (1) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ½¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. *B3*	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Youngstown *R3*	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland *K1*	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh *J3*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh *N2*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill. *L1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon *M3*	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh *N1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling *W5*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland *W4*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Indiana Harbor *Y1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Youngstown *R3*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland *K1*	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh *J3*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill. *L1*	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0	....	....	....	....	....	....
Sharon *M3*	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh *N1*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling *W5*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland *W4*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	35.5	15.0	39.5	19.0	41.0	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5
Indiana Harbor *Y1*	34.5	14.0	38.5	18.0	40.5	21.6	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 15.0c.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge *A3*	....	7.25	8.50	9.30	9.85	....	....
Granite City *G2*	....	7.95	9.20	....	....	....	....
Ind. Harbor *I3*	6.75	7.25	....	....	....	....	....
Mansfield *E2*	7.25	7.75	9.00	9.80	....	....	....
Niles, O. *N3*	7.05	7.55	....	....	....	....	....
Vandergrift *U1*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O. *R3*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville *A7*	6.75	7.25	8.50	9.30	9.85	10.40	11.10

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50	....	....	....
Birmingham *R3*	48.38	48.88	....	....	....	....	....
Birmingham *W9*	48.38	48.88	....	....	....	....	....
Birmingham *S5*	48.38	48.88	....	....	....	....	....
Buffalo *R3*	52.00	52.50	53.00	....	....	....	....
Buffalo *H1*	52.00	52.50	53.00	....	....	63.75	....
Chicago *I4*	52.00	52.50	52.50	53.00	....	....	....
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00	....	....
Cleveland *R3*	52.00	52.50	52.50	....	....	....	....
Daingerfield, Tex. *L3*	48.00	48.50	48.50	....	....	....	....
Duluth *I4*	52.00	52.50	52.50	53.00	....	....	....
Erie *I4*	52.00	52.50	52.50	53.00	....	....	....
Everett, Mass. *M6*	....	59.75	60.25	....	....	....	....
Fontana *K1*	58.00	58.50	....	....	....	....	....
Geneva, Utah *U1, Y1*	52.00	52.50	52.50	53.00	....	....	....
Granite City, Ill. *K3*	53.90	54.40	54.90	....	....	....	....
Hubbard, Ohio *Y1*	52.00	52.50	52.50	....	....	....	....
Ironton, Utah *C7*	52.00	52.50	....	....	....	....	....
Jackson, Ohio *J1,G1*	....	....	....	....	....	62.50	....
Lyle, Tenn. *T3*	....	....	....	....	....	....	66.00
Monessen *P6*	54.00	....	....	....	....	....	....
Neville Island *P4*	52.00	52.50	52.50	53.00	....	....	....
Pittsburgh *U1*	52.00	....	....	53.00	....	....	....
Sharpsville *S3*	52.00	52.50	52.50	53.00	....	....	....
Steelton *B3*	54.00	54.50	55.00	55.50	60.00	....	....
Swedeland *A2*	56.00	56.50	57.00	57.50	....	....	....
Toledo *I4*	52.00	52.50	52.50	53.00	....	....	....
Troy, N. Y. *R3*	54.00	54.50	55.00	....	60.00	....	....
Youngstown *Y1*	52.00	52.50	52.50	53.00	....	....	....
N. Tonawanda, N. Y. *T1*	....	52.50	53.00	....	....	....	....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.84
	2½	12	30.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.80	41.10	48.30
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.03	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.50	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.16	....	....

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipment less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa. *S9*	....	6.80	7.40	9.35	11.65
Cleveland *A5*	4.65	6.45	7.40	9.35	11.65
Detroit *D1*	5.60	6.65	7.25	....	....
New Castle, Pa. *B4*	5.35	6.80	7.40	9.35	....
New Haven, Conn. *D1*	5.85	6.75	7.35	....	....
Sharon, Pa. *S1*	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. *W3*	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. *A5*	4.95	6.75	7.70	9.65	11.95
Youngstown *C5*	....	6.80	7.40	9.35	11.65

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Gal. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢ lb.	Merch. Wire* Gal. ¢ lb.
Alabama City *R3*	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa. *J3*	118	132	....	....	136	140	5.70	6.15
Atlanta *A8*	121	133	....	126	126	143	5.95	6.40
Bartonville *K2*	118	130	....	123	143	143	5.70	6.15
Buffalo *W6*	....	....	....	....	....	....	4.85	....
Cleveland *A6*	125	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	....	5.70	6.15
Crawfrdsvl. *M4*	....	132	....	....	....	145	5.95	6.40
Donora, Pa. *A5*	118	130	....	123	140	140	5.70	6.15
Duluth *A5*	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala. *T2*	118	130	....	123	....	140	5.70	6.15
Houston *S2*	126	138	....	....	....	148	6.10	6.55
Johnstn., Pa. *B3*	118	130	....	....	140	....	5.70	6.15
Joliet, Ill. *A5*	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind. *C9*	120	132	....	125	138	142	5.80	6.05
Los Angeles *B2*	....	....	....	....	....	....	6.65	....
Kansas City *S2*	130	....	....	135	....	152	6.30	6.75
Minnequa *C6*	123	138	130	128	146	146	5.95	6.45
Monessen *P6*	124	135	....	....	....	145	5.95	6.40
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	137	....	....	147	156	160	6.65	6.80
Portsmouth *P7*	124	137	....	....	147	147	6.10	6.60
Rankin, Pa. *A5*	118	130	....	....	140	140	5.70	6.15
So. Chicago *R3*	118	126	140	123	....	136	5.70	5.95
S. San Fran. *C6*	....	....	....	147	....	160	6.65	7.10
Sparrows Pt. *B3*	120	....	....	125	142	142	5.80	6.25
Sterling, Ill. *N4*	118	130	....	123	140	140	5.70	6.15
Struthers, O. *Y1*	....	....	....	....	....	....	5.70	6.15
Torrance, Cal. *C7*	138	....	....	....	....	....	6.65	....
Worcester *A5*	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa. *S10*	....	....	150	....	....	....	....	....

Cut Nails, carloads, base $7.35 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va. (*W5*), $7.15.

* Alabama City and So. Chicago don't include zinc extra.

—Miscellaneous Prices—

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.60	4.00	4.70	....	....	....	....	....
Chicago *R3*	....	....	....	6.15	....	....	....	....
Cleveland *R3*	....	....	....	....	....	9.35	....	....
Ensley *T2*	3.60	4.00	....	....	....	....	....	....
Fairfield *T2*	....	4.00	4.70	6.15	5.60	....	4.50	9.80
Gary *U1*	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor *I3*	3.60	....	4.70	6.15	5.60	....	4.50	....
Johnstown *B3*	....	4.00	....	....	5.60	....	....	....
Joliet *U1*	....	4.00	4.70	....	....	....	....	....
Kansas City *S2*	....	....	....	6.40	....	....	....	9.85
Lackawanna *B3*	3.60	4.00	4.70	....	....	....	4.50	....
Lebanon *B3*	....	....	....	6.15	....	9.35	....	9.85
Minnequa *C6*	3.60	4.50	4.70	6.15	....	....	4.50	9.85
Pittsburgh *R3*	....	....	....	....	....	9.35	....	....
Pittsburgh *O1*	....	....	....	....	....	9.35	....	9.85
Pittsburgh *P5*	....	....	....	....	....	....	....	9.85
Pittsburgh *J3*	....	....	....	6.15	....	....	4.65	....
Pitt'g., Cal. *C7*	....	....	....	....	....	....	....	....
Seattle *B2*	....	....	....	6.65	....	....	4.65	....
Steelton *B3*	3.60	....	4.70	....	....	....	4.50	....
Struthers *Y1*	....	....	....	6.15	....	....	....	....
Torrance *C7*	....	....	....	....	....	....	4.65	....
Youngstown *R3*	....	....	....	6.15	....	....	....	....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

ALUMINUM EXTRUSIONS

fast deliveries

on A, B, C and E Allotments

Any shape that can be contained in a 6 inch circle. Any length up to 40 feet. Send drawings, specifications and data.

Fabrication facilities available!

We are equipped for aluminum fabrication from extrusion to finished product.

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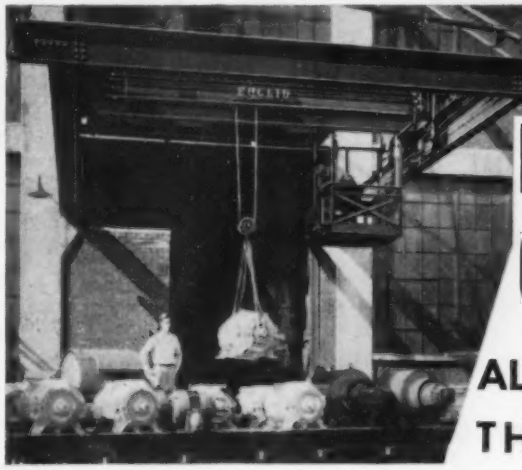


INSIDE OUTSIDE ALL 'ROUND THE PLANT

For best results the type of material handling equipment selected must be determined by the nature of your business and its manufacturing operations.

The size of products — the type of units involved — the sequence of operations — the nature of assembly activities and other factors must be considered.

There is a Euclid crane or hoist ideally adapted to a large majority of these situations — inside—outside—all 'round the plant. Let us discuss them with you. Meanwhile, let us send our catalogs.

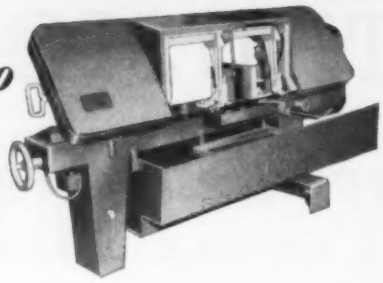
THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON ROAD, EUCLID, OHIO

EUCLID CRANES AND HOISTS *Raise Profits*

GET ACCURACY that SAVES STOCK . . .

. . . get *Kalamazoo* METAL CUTTING BAND SAWS



Here's *real* precision metal sawing that cuts waste to a minimum, saves hard-to-get stock. *Kalamazoo* Band Saws cut bars, rounds, flats, angles, odd shapes to within a few thousandths of size. What's more, there's an absolute minimum of kerf and *no* burr.

You can get Kalamazoo Metal Cutting Band Saws in three sizes . . . for cutting 6" to 12" rounds. 6" x 10" to 12" x 20" flats. Each model can be had with coolant system for continuous cutting. Each is available with casters for complete portability. Write for details on the many exclusive *Kalamazoo* features that spell *better cutting at lowest cost to you.*

MACHINE TOOL DIVISION

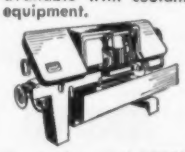
Kalamazoo TANK and SILO CO.

616 HARRISON ST., KALAMAZOO, MICHIGAN

Remember . . . there's a *Kalamazoo* Metal Cutting Saw to fit your exact needs

Model 610 cuts 6" round and 6" x 10" flat. Coolant equipment available.

Model 816 cuts 8" round and 8" x 16" flat. Model 824 cuts 8" round and 8" x 24" flat. Both models are available with coolant equipment.



Heavy-duty Model 1220 cuts 12" plus on rounds and 12" x 20" flat. Available with or without coolant equipment.

"New Process"
Punches • Dies • Rivet Sets
Compression Riveter Dies
Made to highest standards and uniform quality thus insuring maximum service.
Since 1903
Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment.
Square, rectangular, oblong and elliptical shapes made to order.
Write for Catalog 46
GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL ST., CHICAGO 8, ILL.

—Miscellaneous Prices—

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg.	K.	Less Keg.	K.
	Reg.		Hvy.	
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8⅛	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished	48—10
Packaged, plate finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger	$7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

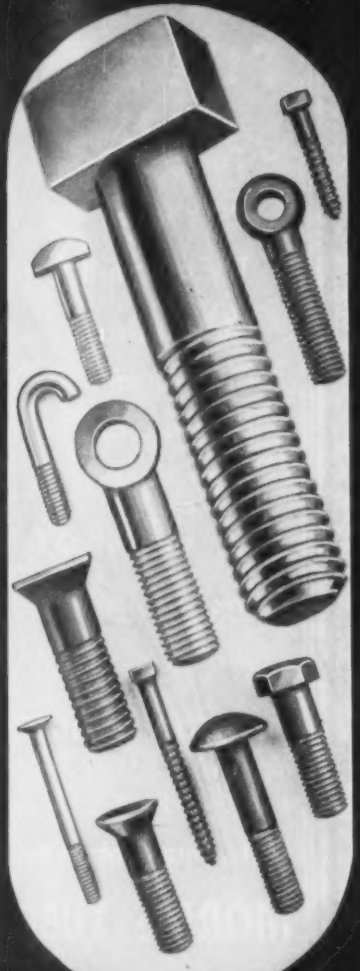
Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	11	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	.....

THREADED SPECIALTIES

TEE BOLTS

by an exclusive method



Among Pawtucket's many specialty products, these lower-cost tee-head bolts are the leaders in this field. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket tee-head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

BETTER BOLTS SINCE 1882

PAWTUCKET

"THE BOLT MAN"

MANUFACTURING COMPANY

327 Pine Street · Pawtucket, R. I.

THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

—Miscellaneous Prices—

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded Balt, Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$62.70
Domestic, f.o.b. Chewalah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. 1952 *prices not yet established.* 1951 *prices were:*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

If

IT'S STAINLESS STEEL

We Have It!

for **IMMEDIATE DELIVERY**

from our Warehouse

- **All Types, Gauges and Sizes**
- **Sheet, Coil and Strip**
- **One Sheet or a Carload**
- **Precision Slitting Facilities**

  24 Hour Service

  50 Pounds or 500 Tons
- **Mill Shipments at Mill Prices**
- ***Distributors for***

  Washington Steel Corp.

  Eastern Stainless Steel Corp.

Largest Steel Warehouse in the West . . .

Specializing Exclusively in Stainless

AFFILIATED METAL PRODUCTS

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Chemical Firm Reports:

MAINTENANCE REDUCED 50%

Using

Erie INDUSTRIAL PORCELAIN ENAMEL

Salt conveyor buckets, coated with ERIE Industrial Porcelain Enamel have reduced elevator maintenance for a large chemical firm by 50%. ERIE Industrial Porcelain Enamel is impervious to the salt corrosion and outwears ordinary steel 7 to 10 times in abrasive service.

SOLVE YOUR PROBLEMS WITH PORCELAIN ENAMEL

Special types of ERIE Industrial Porcelain Enamel provide high acid and corrosion resistance, heat and thermal shock resistance, abrasion resistance and lowered coefficient of friction.

Send ERIE a sketch, sample product or component along with detailed operating conditions for a FREE RECOMMENDATION regarding the applicability of ERIE Industrial Porcelain Enamel to your problem.

Write for FREE Bulletin on Porcelain Enamel Characteristics

THE Erie ENAMELING CO.
1405 W. 20th ST.
INDUSTRIAL DIVISION
ERIE, PENNSYLVANIA

—Ferroalloy Prices—

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed: lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

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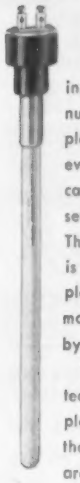

A background of many years of experience and "know-how" go into the production of Gordon Platinum, Platinum-Rhodium Thermocouples. From this experience has evolved the Gordon policy which calls for the utmost in quality and service, the utmost in value to clients. That is why Gordon platinum wire is carefully checked for thermocouple accuracy against a master thermocouple...calibrated and certified by the National Bureau of Standards.

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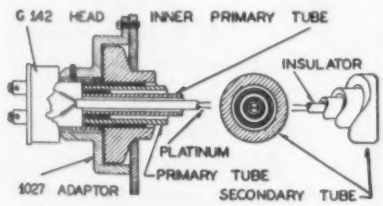

into a complete thermocouple assembly is light in weight and permits easy replacement of new elements into a protecting tube assembly.

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Ferroalloys

Continued

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pbh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C 7.00% max. Si	21.25	23.10	24.30

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 19.15¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.50

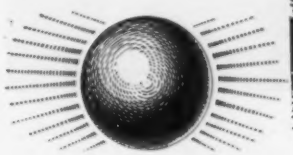
Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

WESTWARD HO

This Westward-Ho early American pressed glass compote depicts a log cabin, the early American home. The bison and deer, food. The crouched Indian, falling back, giving way to progress and world leadership.



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SNAP-OFF COIL, drop-on assembly feature of job-designed, easy-to-handle preforms raised brazing rate of electrical transformer connectors from 360 to 560 units per hour . . . yet equipment and procedure were the same as used before with individual, machine-wound rings.

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BUTT, LAP OR GAP rings are available in *any* size in *Silfos* or *Easy-Flo*. Stress-relieved, rings snap snugly around outer diameters, snap into inner grooves for desired fill and strong, leak-proof bond.

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Suburb of Milwaukee, Wis.

—Other Ferroalloys—

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered $5.00

Ferrovanadium, 35-55% contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Les ton lots, per pound.... 50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 68¢
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe. 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

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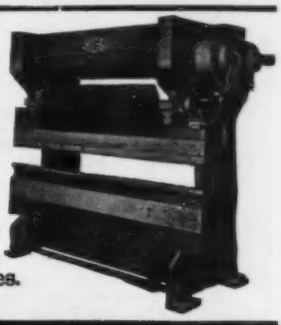

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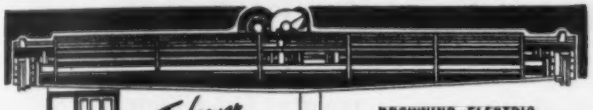

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#9 William White Bulldozer, Motor Driven with 50 H.P. Motor. 440 v. 3 ph. 60 cycle. Face of Crosshead 20" x 90". Movement of Crosshead 24".

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3½ Ton Wellman-Seaver-Morgan Revolving Charging Machine—Floor Type.

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Two—5 ton P&H Cranes Span 220/3/60 AC. Each equipped with two 2½ ton trolleys and five motors.
5 ton Niles Crane 56' 3⅜" Span. Three motors, 440 volt, 3 phase, 60 cycle.
25 ton P&H Crane 80' Span, With 5 ton Auxiliary Four Motors 440 volt 3 phase 60 cycle. Built 1942-43 for outdoor service.

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¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment.

FURNACE—BILLET HEATING
Surface Combustion Super Fast Heating Furnace Tangential Burner, 3 Section, Pusher Capacity 3600 lb. per hr. gross, Max. Temp. 2750° F. Complete Elecl. Equip.

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25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

PLANERS
48" x 48" x 20' Cincinnati, Four Head
48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING MACHINE
Type "B" Crown Full Automatic Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

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1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" stroke, 18" Shut Height.

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8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.
12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.
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18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.

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300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ⅛" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2¼" max.

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700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide.
40 KVA Sciaky, Spot Welder, 36" Throat 440/3/60 operation.
250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle, Mechanical Contractor Hi-Pressure Clamp Assembly—NEW 1949.

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Strike Effect Spreads—The long black cloak of the steel strike was casting its shadow over the used machine tool business, too. In Pittsburgh, dealers reported high interest in steel mill equipment, but activity is virtually at a standstill. Reason is the impossibility of getting into the closed steel plants to inspect equipment.

Paralleling the used tool doldrums in Pittsburgh was the equally bad if not worse condition of the used electrical equipment market there. One large dealer reported May volume 25 pct below the April pace. Indications are that when the June tally is in, there will be another decline of around 20 pct.

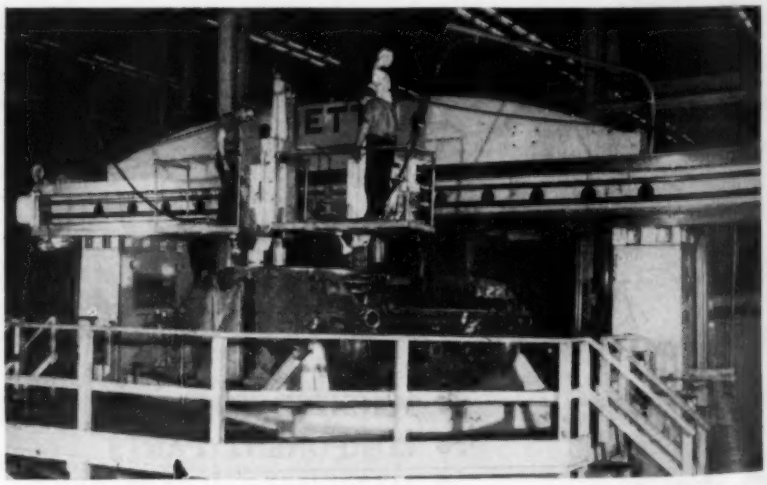
No Siesta—Despite the glum aspects of the current machine tool slump, Frank B. Foster, Inc., Pittsburgh, recently made a sale south of the border. The company has completed shipment of a used 9-in. bar mill to the Steel Foundry of Tepeyac, Inc., near Mexico City. This mill, along with new 16 and 12 in. bar mills now nearing completion will be used primarily for the production of alloy steel bars.

The bars ultimately will be forged into grinding balls for use in Mexico's cement and nonferrous mining industries.

Sale of the bar mill was not Foster's first transaction with the Mexican firm. Shortly after the war, Foster shipped a complete electric steel foundry from Cleveland. The recent purchase of the bar mills was part of Tepeyac's expansion program.

The Pittsburgh company supplied practically all equipment for the mills, including a billet heating furnace, motors, speed reducers and other accessories. The mills plan to start with a 6 x 6 ingot and will produce bar sizes down to ¼-in. diam.

Auction—An auction sale of a reported $1.5 million worth of tool room, production and manufacturing equipment is scheduled for June 23-26 at the former plant of the H. & B. American Machine Co., Pawtucket, R. I. Included in the extensive assortment of machinery and tools are Monarch Tool Room lathes, Cincinnati Grinders, Johnson Turret Lathes, various models of Cleveland Automatic Screw Machines, Fellows Gear Shapers and Lipe Carbomatic Production Lathes.



INGENUITY: Cadillac Tank Plant in Cleveland was unable to wait the 18 months needed for construction of two boring mills large enough to swing a Walker Bulldog tank hull on the table of each machine. Since Betts Boring Mills with 12-ft beds were available, Cadillac, with the aid of Betts engineers, worked out a way of extending the side columns of a 12-ft mill to obtain a swing clearance of 24 ft.

A Case in Point...

The modern rolling mill is a succession of related mechanical operations. The over-all efficiency of the mill is determined by the efficiency of each mechanical unit . . . and how well it is related to previous and subsequent operations.

The record tonnages being achieved on Morgan mills and the continued world-wide demand for them is proof of their success. Nevertheless our engineers continue to develop and put into operation new ideas and improvements. A case in point is the Rotary Disc Shears described below.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

English Rep., International Construction Co., 56 Kingsway, London, W. C. 2, England

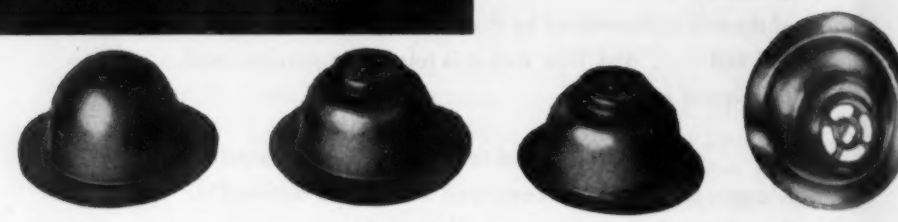
RM-46

ROTARY DISC SHEARS . . . These shears have the capacity to cut bars up 1¾" diameter at speeds up to 3000 f.p.m. The opening and closing of the knive is performed hydraulically, dispensing with the use of magnetic clutches and brake thereby eliminating all "creep" and making the action positive and precise. Th Vee-shape cutting edge of the knives leaves no "beard" or slivers where the cu is made. Here we show twin shears for double strand rolling.

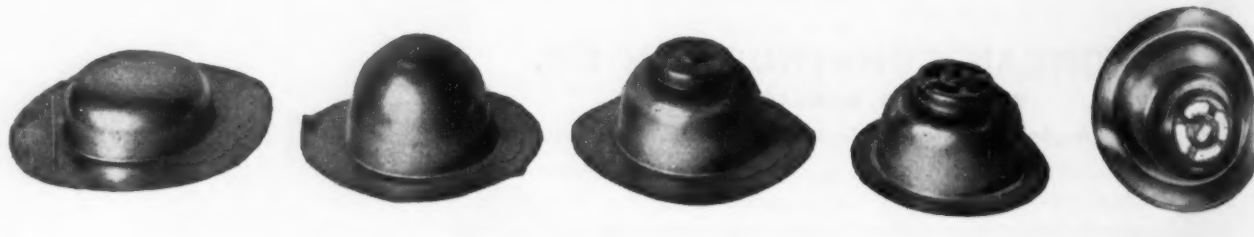
MORGAN
WORCESTER
ROLLING MILLS - MORGOIL BEARINGS
WIRE MILLS - GAS PRODUCERS - AIR EJECTORS
REGENERATIVE FURNACE CONTROL

Deep-Draw Type 430?

Yes, here's how!



One drawing operation, a restrike, a piercing and trimming operation, followed by finishing, produced this part from Type 302.



When replaced with Type 430, part required only an extra drawing operation plus additional finishing work.

Type 430 stainless steel *can* be substituted for Types 302 or 304 in most drawing jobs. It often requires an extra operation or two—even a process anneal at times—but the job can be done in most cases. This may be important to you because Armco 17 Type 430, is available today, free from Government restrictions imposed on the nickel-bearing types like 18-8, Type 302.

Low Work-Hardening Rate

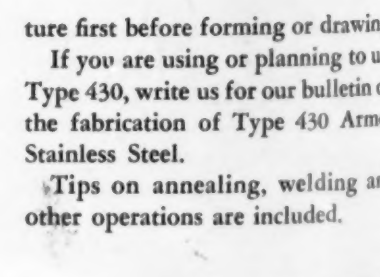
The work-hardening rate of Type 430 is low, so it is often possible to make a series of draws without intermediate anneals. A 20-25 per cent reduction can usually be made on the first draw—about 15 per cent on subsequent draws.

Draw-Rings Need Liberal Radii

Draw-ring radius should be larger than for 18-8 to encourage flowing rather than stretching of the metal. Increased blank size with reduced hold-down pressure will also assist metal flow, when necessary. Draw-rings of hard aluminum-bronze alloy are recommended to prevent surface pick-up, and good stainless steel drawing compounds are essential.

Keep Stock Warm

Some manufacturers claim improved drawing qualities from warmed stock. On severe draws they dip blanks in boiling water just before drawing. Cold stock should never be used for any draws; bring it to room temperature first before forming or drawing.



If you are using or planning to use Type 430, write us for our bulletin on the fabrication of Type 430 Armco Stainless Steel.

Tips on annealing, welding and other operations are included.

ARMCO STEEL CORPORATION

3042 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

Conventions & Meetings

June 22-24—Alloy Casting Institute, annual meeting, The Homestead, Hot Springs, Va. Institute headquarters are at 32 Third Ave., Mineola, N. Y.

June 23-27—American Society for Testing Materials, annual meeting, Hotels Statler and New Yorker, New York. Society headquarters are at 1916 Race St., Philadelphia.

June 23-27—The American Society of Mechanical Engineers, Oil & Gas Power Div., 24th annual conference and exhibit, Hotel Statler, Buffalo. Society headquarters are at 29 W. 39th St., New York.

June 26-28 — American Society of Mechanical Engineers, Applied Mechanics Div., 2nd Western Meeting, University of California, Los Angeles. Society headquarters are at 29 W. 39th St., New York.

July 16-17—National Constructors Assn., Edgewater Beach Hotel, Chicago. Association headquarters are at 50 E. 41st St., New York.

Aug. 11-13—Society of Automotive Engineers, National West Coast Meeting, Fairmont Hotel, San Francisco, Calif. Society headquarters are at 29 W. 39th St., New York.

Sept. 4 — Society of Automotive Engineers, Centennial of Engineering Banquet, Hotel Knickerbocker, Chicago. Society headquarters are at 29 W. 39th St., New York.

Sept. 4-18—American Society of Lubrication Engineers, semi-annual symposium, Chicago. Association headquarters are at 343 South Dearborn St., Chicago.

Sept. 8-10 — American Standards Assn., National Standardization Conference, Museum of Science and Industry, Chicago. Association headquarters are at 70 E. 45th St., New York.

Sept. 8-11—Society of Automotive Engineers, National Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., New York.

Sept. 8-11—American Society of Mechanical Engineers, Fall Meeting, Sheraton Hotel, Chicago. Society headquarters are at 29 W. 39th St., New York.

Sept. 8-12—Instrument Society of America, Seventh National Instrument Conference and Exhibit, Cleveland Auditorium, Cleveland. Assn. headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 10-12—National Petroleum Assn., Annual Meeting, Hotel Traymore, Atlantic City, N. J. Assn. headquarters, Munsey Bldg., Room 958, Washington, D. C.

Sept. 14-18—Pressed Metal Institute, National Meeting, Pocono Manor, Pa. Institute headquarters are at 13210 Shaker Square, Cleveland.

Sept. 14-20—Concrete Reinforcing Steel Institute, Semi-Annual Meeting, The Broadmoor, Colorado Springs, Col. Assn. headquarters are at 38 S. Dearborn Street, Chicago.

HERE'S A FIRE EXTINGUISHER YOU CAN RECHARGE AT ANY AIR PUMP!

An ordinary air pump will prime this new Kidde dry chemical extinguisher with more fire-killing power than any other unit its size!

See how easy it is to recharge! Just unscrew the head, put in five pounds of dry chemical, screw the head back on and it's ready to charge from any plant or service station air pump.

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This revolutionary new Kidde extinguisher is so safe, so sure, you'll find it a necessity for trucks, garages, factories—wherever there is a danger of small fires.

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1 ***CHARGES AT ANY AIR PUMP.*** **Operates at 150 lbs. pressure.**

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U. S. INDUSTRY'S BUYING TEAM Votes THE IRON AGE No. 1 among all metalworking magazines

- In a comprehensive readership survey 18 leading industrial companies contacted the men on their customer and prospect lists . . . the men they knew controlled or influenced buying.
- These lists, in themselves, definitely showed that buying is a teamwork function, with sometimes one combination of executives, sometimes another, deciding the type and make of product to be bought.
- Among metalworking publications The IRON AGE was the No. 1 choice of the combined executive group . . . with impressive strength in all of them.
- Look carefully at the tabulation to the right. It proves conclusively that The IRON AGE, with its powerful horizontal coverage of metalworking executives, is your strongest medium to reach *all* the men who buy.

This is No. 4 of a series

No. 1—Metalworking votes The IRON AGE No. 1 among all types of magazines.

No. 2—U. S. Industry votes The IRON AGE No. 1 among all industrial magazines.

No. 3—U. S. Industry votes The IRON AGE most useful of all metalworking magazines.

CHECK THE PROOF OF IRON AGE LEADERSHIP

An analysis of the first 12 metalworking publications based on total mentions from all industry.

PUBLICATION	TOTAL MENTIONS	ADMINISTRATION	PROD. & OPER.	PLANT SERV.	PROD. DESG.	PURC.	SALES	OTH.
IRON AGE	6,729	1,318	1,713	352	319	2,693	263	71
STEEL	6,178	1,324	1,401	282	278	2,569	254	70
AMERICAN MACHINIST	1,983	434	791	248	169	160	76	25
MACHINERY	1,542	268	655	200	189	153	62	15
MECHANICAL ENGINEERING	1,536	161	647	372	274	24	54	4
MACHINE DESIGN	1,477	160	409	57	726	60	56	9
PRODUCT ENGINEERING	1,474	168	440	99	668	52	42	5
FOUNDRY	939	344	383	36	21	122	22	11
METAL PROGRESS	867	83	565	35	96	27	58	3
ELECTRICAL MANUFACTURING	815	116	195	38	404	27	26	9
MATERIALS & METHODS	803	53	445	62	155	46	31	11
PRODUCT ENGINEERING & MANAGEMENT	701	72	389	98	55	64	17	6

WHY IS THIS SURVEY NOTEWORTHY?

1. It is the largest, most comprehensive industrial readership survey ever conducted.

2. The following 18 leading companies participated in this survey.

Aluminum Co. of America
The Black & Decker Mfg. Co.
Brown & Sharpe Mfg. Co.
Crane Co.
Dodge Mfg. Co.
General Electric Co.
Apparatus Division
The Goodyear Tire & Rubber Co.
Mechanical Rubber Goods Div.
Harnischfeger Corp.
Hyster Company
P. R. Mallory & Co., Inc.
Minneapolis-Honeywell
Regulator Co.
Brown Instruments Div.
Socony Vacuum Oil Co.
Union Carbide & Carbon Corp.
Bakelite Division
Carbide & Carbon
Chemicals Div.
Electro Metallurgical Div.
The Linde Air Products Co.
United States Steel Co.
Westinghouse Electric Corp.
Apparatus Division

3. The 18 companies mailed a total of 198,837 questionnaires to individuals on their customer and prospect lists. Replies totaled 42,878.

4. All individuals contacted were men *who control or influence* buying, regardless of title or industry.

5. Results were classified and tabulated by the McGraw-Hill Publishing Co.

6. Magazines of all types — general, business, industrial — are included in survey results.

WHY IS THE IRON AGE NO. 1? Because The IRON AGE is a *horizontal* publication. It is edited for *all* management — administration, production, engineering, financial, purchasing. Its intense readership *across* management plus the largest total distribution of any metalworking magazine *across* the wide metalworking industry make it a natural to be voted No. 1.

WHY IS THE IRON AGE NO. 1? Because The IRON AGE's excellent record of *service* to mighty metalworking is unparalleled. Every week the latest vital news, market reports, technical articles—any important information that affects metalworking executives—are flashed to the industry with the same fast-paced schedule general news is distributed by a Time or Newsweek.

WHY IS THE IRON AGE NO. 1? Because of The IRON AGE's absolute reliability and authenticity—attested to by thousands of quotes in the U. S. press . . . *"According to The IRON AGE"*. That's why metalworking men, administrative and operating executives believe in it, make decisions from it, run their plants by it . . . and buy out of its busy advertising pages.

Ask your IRON AGE representative to show you a detailed tabulation of this survey—publication by publication.

the IronAge ABC ECA NBP

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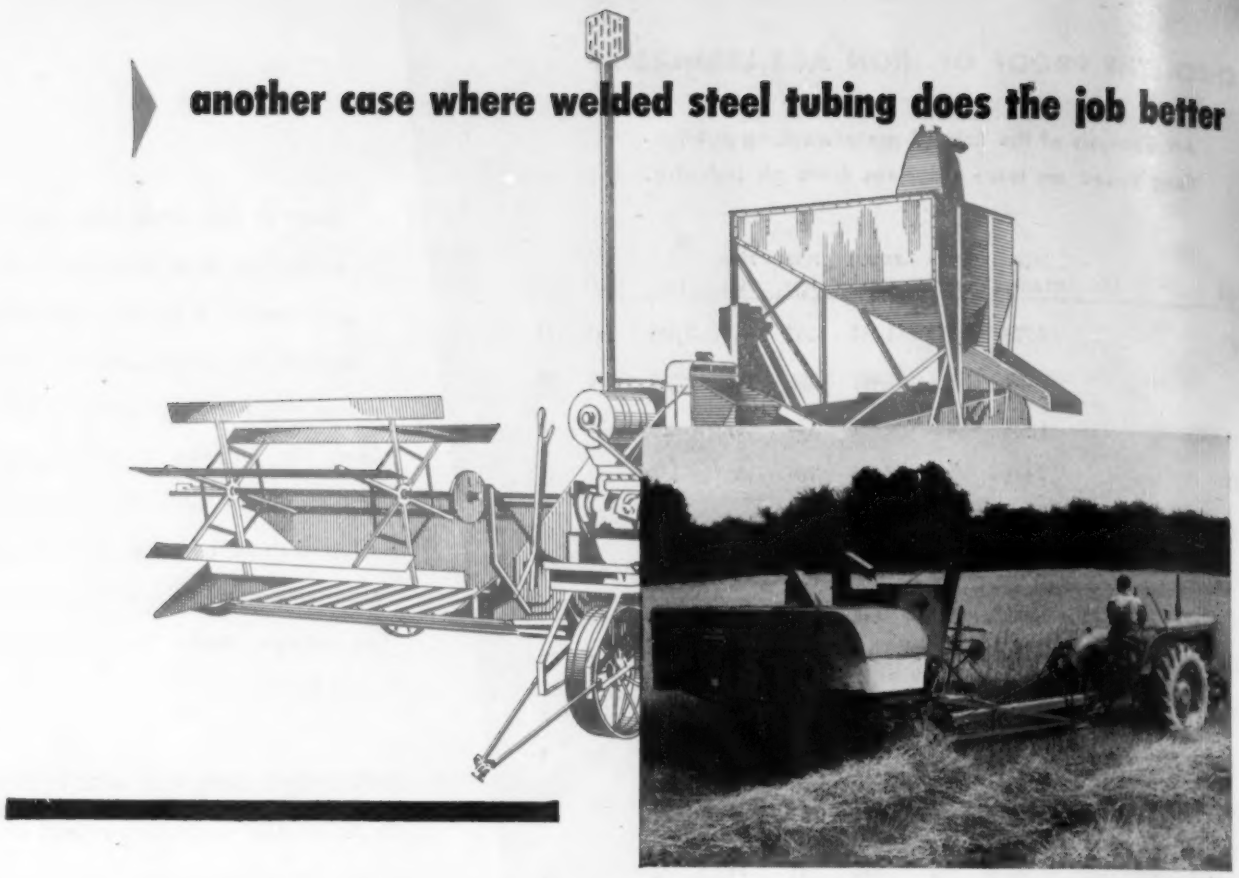
another case where welded steel tubing does the job better



ELECTRUNITE Steel Tubing made this farm equipment better at lower cost . . .

it can do the same for you . . .

Unnecessary dead weight was lopped off in hundred-pound chunks without reducing strength when a leading farm implement manufacturer designed his line to use Republic ELECTRUNITE Steel Tubing at every possible point.

Strength and shock resistance were increased because Republic ELECTRUNITE Steel Tubing provided maximum strength per pound of metal over ordinary conventional shapes. Troublesome torsion and weaving of implements on rough ground was cut drastically . . . useful life of the implements was greatly lengthened, and maintenance reduced.

Does this give you some ideas about *your* product . . . whatever it may be? Republic ELECTRUNITE Steel Tubing can keep your product strong yet make it lighter, make it better at lower cost, more attractive to the man who uses it . . . and who buys it. We'd like to tell you our ideas.

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Production Pointers from GISHOLT

TIME-SAVING IDEAS

Presented as a service to machine shops, we hope some of these interesting ideas, culled from thousands of jobs, will suggest ways to help you cut time and costs in your own metal work.

HYDRAULIC LATHES PAIR UP FOR BIG OUTPUT OF BEARING RACES

34 Pounds of Metal Removed in Two Fast Operations

Here's a setup for machining large spherical roller bearing races that may give you some practical ideas.

The job is done in two operations with the work divided between two Gisholt No. 24 Hydraulic Automatic Lathes. Together, they remove a total of 34 pounds of metal from the 86-lb. forgings of 52100 bearing steel.

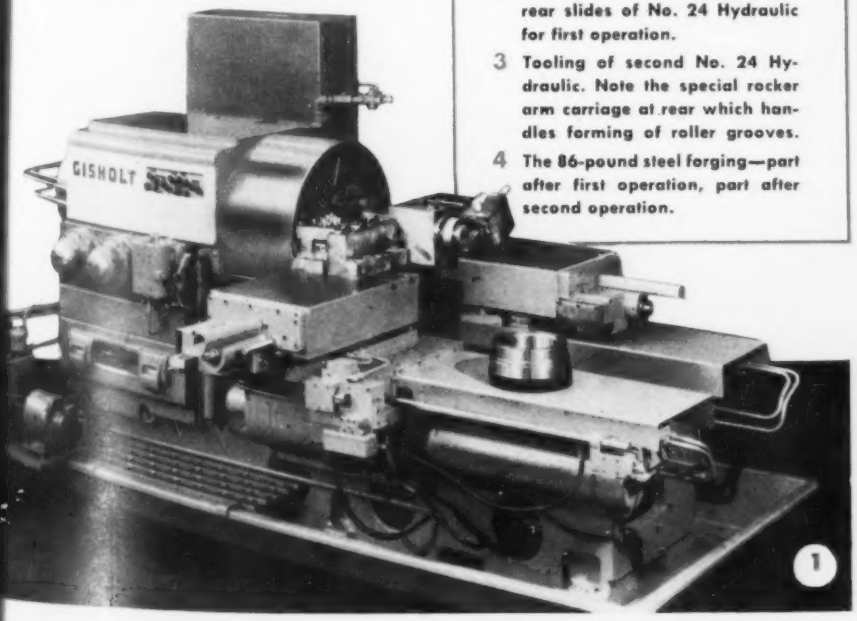
First operation: Part is chucked on the O.D. with a 3-jaw hydraulic chuck. Tools on the front slide turn up to the jaws and face, chamfer and form the radius to the bore. Boring is done from the rear slide, which has a special attachment that provides tool relief. Floor-to-floor time is only 2.80 minutes.

Second operation: A hydraulically operated arbor holds the part. Tools on the front carriage finish turn, face, chamfer and form the radius of the bore. A special rocker arm type carriage at rear tips in shaving tools to form both roller grooves. The form cutters measure 1⅞" wide. The husky No. 24 Hydraulic handles this chip load with ease, leaving an extremely smooth finish entirely free of chatter marks. Floor-to-floor time for this operation is also a brisk 2.80 minutes.

With their completely automatic cycle, these two No. 24 Hydraulics handle an interesting variety of operations with unusual speed.

PHOTO CAPTIONS

1. **This No. 24 Hydraulic handles first operations on bearing races.**
2. **Close-up of tooling on front and rear slides of No. 24 Hydraulic for first operation.**
3. **Tooling of second No. 24 Hydraulic. Note the special rocker arm carriage at rear which handles forming of roller grooves.**
4. **The 86-pound steel forging—part after first operation, part after second operation.**



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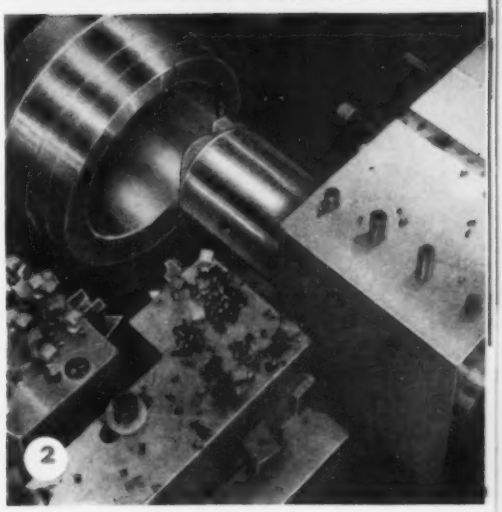
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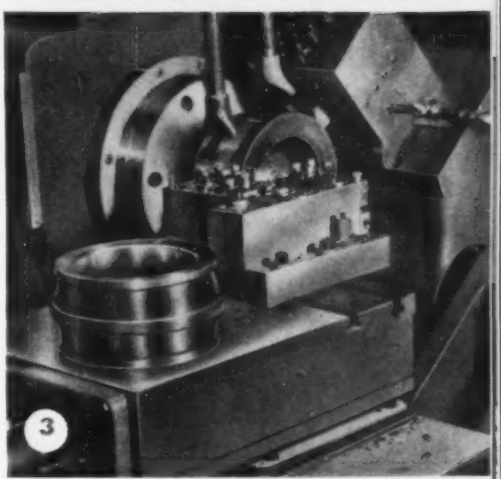
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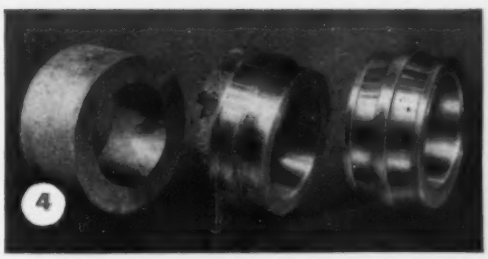
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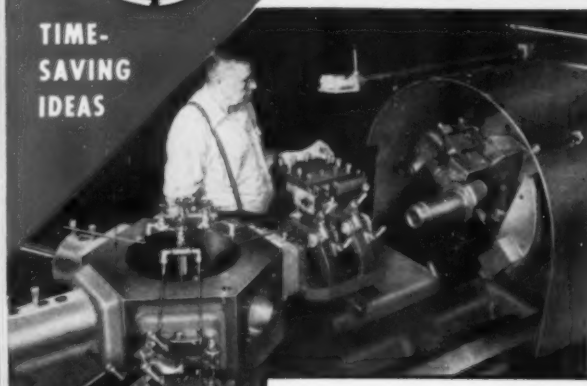
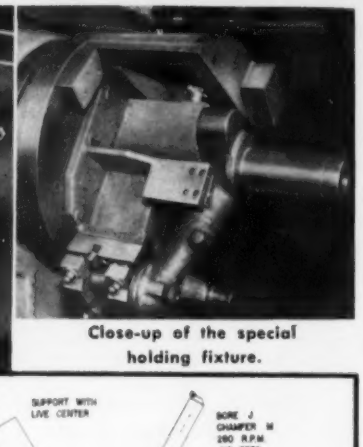
GISHOLT

TIME-SAVING IDEAS

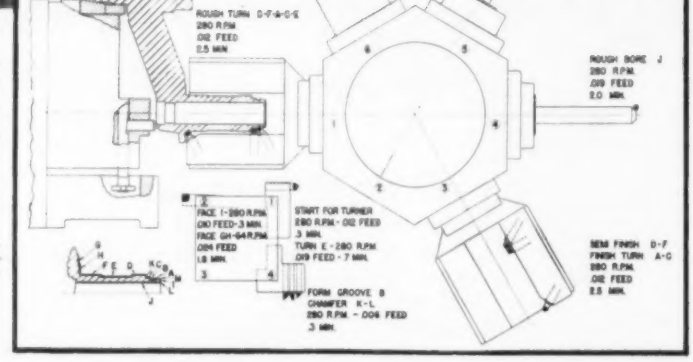
HOW TURRET LATHE HANDLES AWKWARD PART



The Gisholt 5L Saddle Type Turret Lathe used on this interesting job. Note turret coolant distributor.



Close-up of the special holding fixture.



Tooling layout for machining bogie axles.

Special Counterweighted Fixture Does the Trick!

This part was a tough proposition, from the holding point of view. It's a bogie axle—big, awkward and offset from the turning centerline.

The problem was solved with a Gisholt 5L Saddle Type Turret Lathe and a special counterweighted holding fixture. Fixture and part were balanced as a unit on a Gisholt Balancer to provide a faster operating speed.

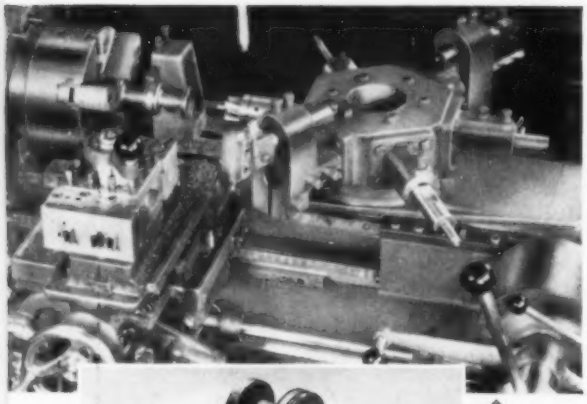
The previously machined hub is used for locating and driving. Conventional bar tools on the hexagon turret handle the turning and boring of the second hub. Tools on the quick-indexing square turret form, face and chamfer, while the hub is supported with a live center from the hexagon turret.

Floor-to-floor time for the larger of the two bogie axles is 20.5 minutes. Carbide-tipped tools are used throughout, with the spindle operating at 280 r.p.m.

A special counterweighted holding fixture makes it possible to turn a difficult problem into a turret lathe job.

SPECIAL TOOLING SIMPLIFIES PISTON PRODUCTION

A Little Extra Tooling Goes a Long Way



Tool setup for machining exhaust pistons. Note special tool blocks on square turret for rough and finish grooving.

Exhaust pistons fully machined on No. 4 Ram Type Turret Lathe.

Here's a really businesslike setup for machining a variety of cast iron exhaust pistons. The machine doing the job is a Gisholt No. 4 Ram Type Turret Lathe.

The job is quite standard except for the grooving. Simple operations from the hexagon turret include boring, counterboring, reaming and step-turning. Facing between the flanges is done by a single forming tool mounted in the standard rear tool post.

Grooving is handled from the quick-indexing square turret on the front of the cross slide. This has been wisely planned around two special tool blocks, one having tools for rough grooving and chamfering, and the other with tools for finish grooving. During the grooving operation, the workpiece is supported by an arbor on the hexagon turret.

Both carbide and H.S.S. tool bits are combined to provide maximum cutting efficiency in a minimum of machining time.

Special tools on the cross slide of this Ram Type Lathe do rough and finish grooving on a variety of exhaust cylinders.

***Jet engines** present real machining problems. How turret lathes are solving many of these is told in a 4-page photo story. Write for your free copy. It has many helpful ideas.*

GISHOLT

GISHOLT

TIME-SAVING IDEAS

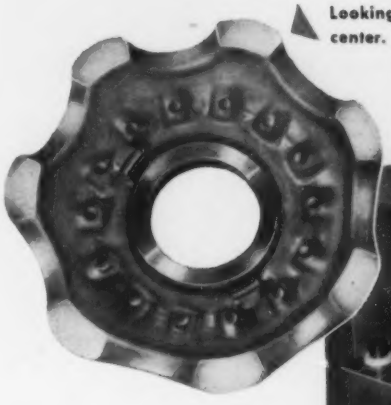
ALUMINUM FORGINGS WITH INTERRUPTED CUTS . . . NO PROBLEM HERE

Simplimatic Has Right Speeds and Feeds to Make Job Easy

Here's a job of turning aluminum with interrupted cuts. Normally it would present some real problems . . . but not the way it's worked out for the Simplimatic Automatic Lathe.

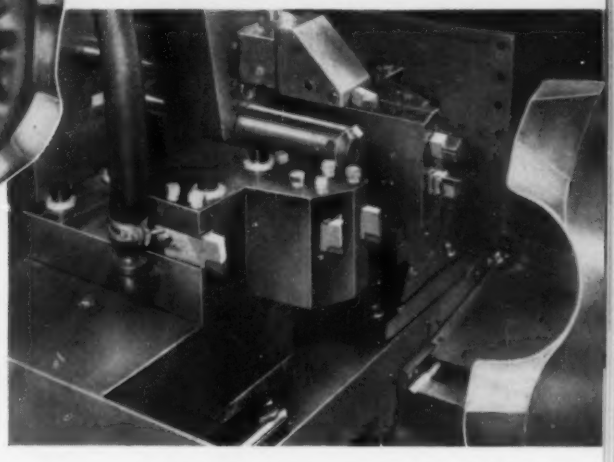
It's a bulky aluminum forging which becomes a crankcase center for an aircraft radial engine. A total of seven surfaces is machined, with two of the passes being heavy interrupted cuts. The part is located in the bore and held by an air-operated draw-back fixture. Tools on the front slide handle the recessing around the hub. Tools on the center slide chamfer the bore and finish turn the hub. Tools on the rear slide face the hub and the two sets of bosses.

Using a spindle speed of 500 r.p.m. and feeds of .010" and .005", the floor-to-floor time is an even four minutes. The parts are smooth and accurate, even with the interrupted cuts.



Looking into a machined aluminum crankcase center. Note the interrupted cuts.

Close-up, showing tooling on the Simplimatic's three slides.



The Simplimatic is ideal for this job because it permits three individual tool slides, each feeding at the best rate of feed for its particular work on this aluminum part.

FASTERMATIC MAKES FOUR PASSES TO FINISH TAPER BORE

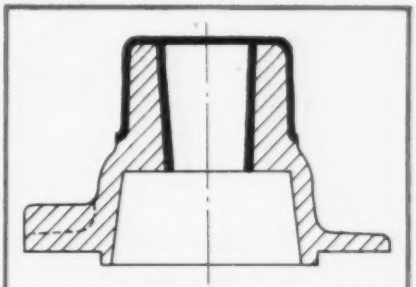
Automatic Cycle Permits Operator to Handle Other Machines

Most of the work on these cast alloy steel steering clutch couplings is in the bore. Four passes must be made through it to finish the taper.

The 2F Fastermatic has an air chuck for holding the part. Work starts with a step drill on the first turret station, cleaning out the cored hole. At the same time, the hub is rough turned and chamfered from the rear independent cross slide. On the second turret station the taper bore is roughed out with gang tools, while tools on the front cross slide finish face the hub and the flange at the base of the hub. The bore is rough taper reamed from station three and finish taper reamed from station four. Floor-to-floor time, using both H.S.S. and carbide tools, is 12.0 minutes.

With the job handled on a Fastermatic Automatic Turret Lathe, an operator is needed only for unloading and loading the parts. The remainder of the time, while the Fastermatic is going through the automatic cycle, he is free to work other machines.

All work on the hub and bore is performed automatically and in a single operation by the Fastermatic.



Heavy lines show work done by Fastermatic.

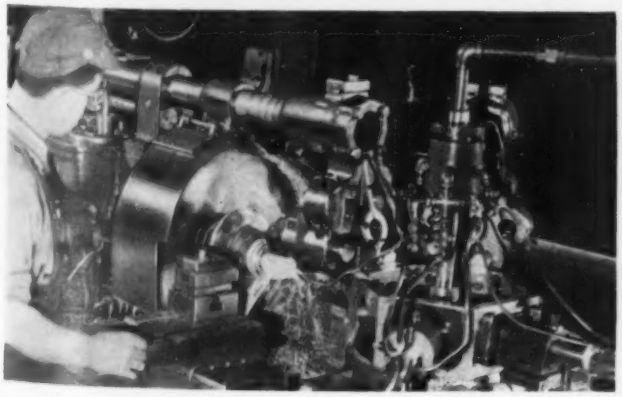
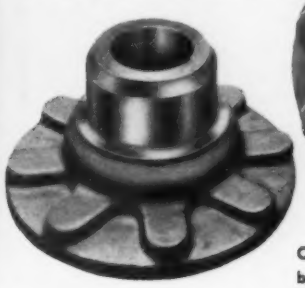


Photo shows start of automatic cycle for Fastermatic.



Complete couplings, showing taper bore and hub work.

TIME-SAVING IDEAS

FAN BLADES BALANCED 400 PER HOUR

Vertical Machine Sets Record for Production Balancing

Here is the 1SV1 DYNETRIC Balancing Machine doing high volume balancing of small fans. Static unbalance is measured, located and corrected at a rate of more than 400 fans per hour. The operator reads the amount of unbalance directly from the meter in terms of small plugs which are pressed into the root of the blade with a hand tool.

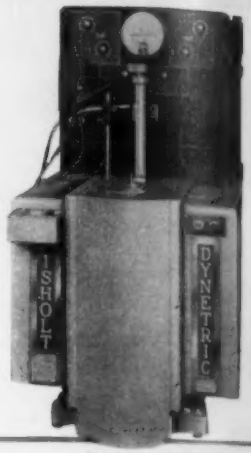
The series of 1SV Balancing Machines are high production machines from every standpoint. They have all the newest electrical and mechanical improvements—plus a new vertical design which reduces operator fatigue to an absolute minimum and thereby increases daily output.

There are four models in the 1SV series—two for static balancing (single plane) and two for dynamic balancing (two plane). Write for literature.

Operators like the 1SV Balancing Machines because they are simple to operate.

At a rate of 400 per hour, the cost of balancing these small fans is insignificant when compared to the added smoothness, greater quietness and longer life of the parts.

DYNETRIC BALANCERS



A new booklet "Static and Dynamic Balancing," carries helpful information reprinted from the latest A.S.T.E. Handbook. Write for your reprint. Also, ask for details and starting dates of the Gisholt Balancing School, the most complete training program of its kind available.

SUPERFINISHING GIVES BEARING SURFACES MUCH LONGER LIFE

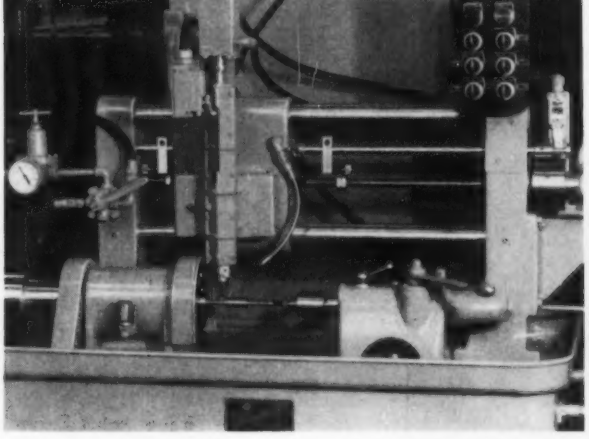
Fast Automatic Operation

The part you see loaded in this Special Model 50 Superfinisher is a stainless steel fan shaft rotor. The two bearing seals, one on each side of the large O.D., are the Superfinished surfaces.

The parts come to this machine with the bearing surfaces ground to 10-12 micro inches RMS. The operator merely loads the work, and presses a button to start this fully automatic cycle.

Rough Superfinishing on the .393" left bearing begins, with the part rotating at 350 r.p.m. Then the speed changes to 1000 r.p.m. for finishing. Completing this surface, the head rises automatically, moves to the right and comes down to repeat the operation on this second bearing. Finally, the head moves up again, part rotation and stone oscillation cease—and the automatic operation is completed. Both bearing surfaces now measure 3-5 micro inches RMS. Floor-to-floor time is just 35 seconds.

With Superfinishing, service life of these parts will be 4 or 5 times longer because the vital bearing surfaces are free from smear metal, chatter marks, grinder flats, etc.

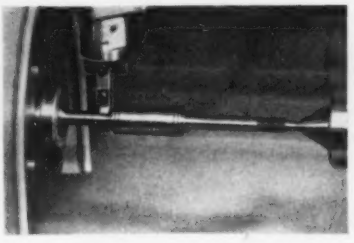


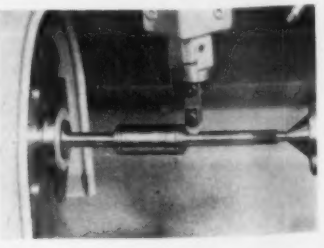
Special Model 50 used for Superfinishing bearing surfaces of fanshaft rotors.

First Superfinishing is on left bearing surface. Head then rises and moves to right to do second bearing surface.

In this quick inexpensive operation, the two bearing surfaces are brought down from 10-12 micro inches RMS to 3-5 micro inches RMS. Superfinishing pays!

Write for book "Wear and Surface Finish."





No. 5-652
589

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

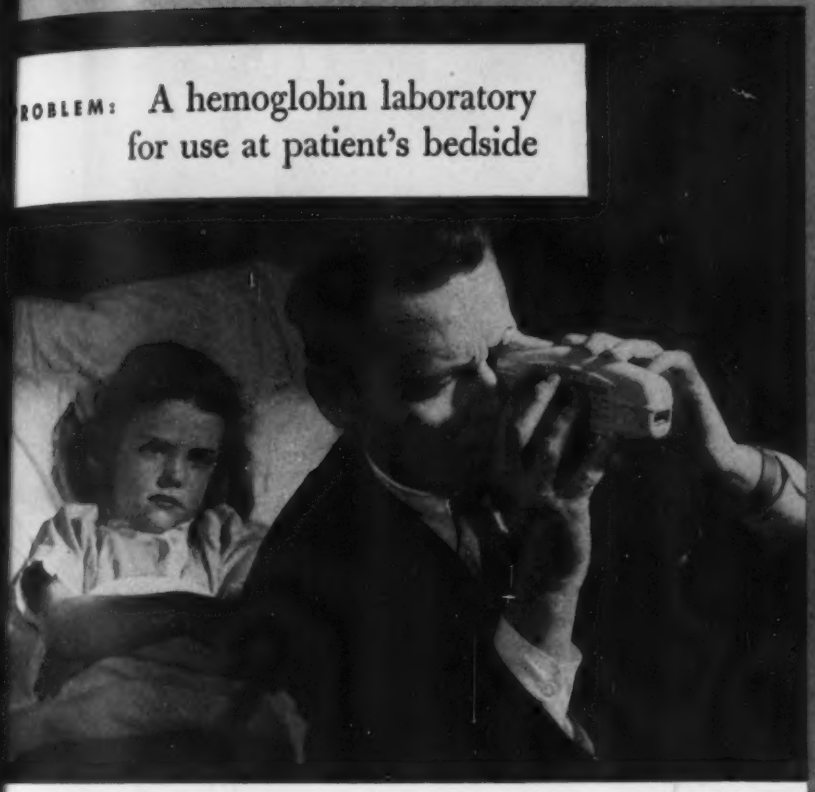
Write for your copy of the new General Catalog.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

PROBLEM: Armor plate for eyes

ANSWER: If you dropped steel balls on *your* glasses, they'd shatter in dangerous splinters. AO safety-goggle lenses won't splinter. Scientists at American Optical devised a heat treatment that makes glass many times as strong, eyes safer.

PROBLEM: A hemoglobin laboratory for use at patient's bedside



ANSWER: Today, a physician need not send blood samples to a laboratory for hemoglobin analysis and delay diagnosis. Within 3 minutes, he can read the answer in the Hb-Meter. This meter is so fast that a patient's condition can be watched during treatment. Heart of the instrument is an accurately polished glass wedge, graded in color, against which the blood sample can be matched. The Hb-Meter is a creation of American Optical Company.

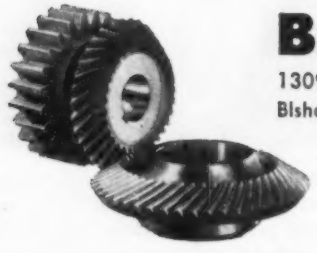
PROBLEM: To keep movie film from catching fire

American Optical

ANSWER: *Right,* film shielded by ordinary glass catches fire. *Left,* AO heat-absorbing glass prevents fire. This glass, developed for floods and projectors, absorbs 90% of heat from projected light, passes movie-film color in true values. Write us about your development problems. American Optical Company, 55 Vision Park, Southbridge, Mass.

Quantity Production . . .

- Quantity production of identical gears offers a challenge that we here at BRAD FOOTE are eager to accept.
- Multiple spindle machines, duplicate machines, numerous and varied machines, every machine that's needed—PLUS men of long experience making close tolerance gears . . . these factors make it possible for us to confidently accept such a challenge.
- When you specify BRAD FOOTE gears, you do so with the knowledge that each gear will be made to exact specifications; that every gear of a quantity will be identical in structure, in size, and in appearance; that each operation on every gear will be performed by BRAD FOOTE people in BRAD FOOTE shops. No one will share our responsibility.
- You will be satisfied with the BRAD FOOTE gears you buy because they will give long, economical service on the equipment you operate, or on the machines you sell to others.
- Your inquiries are invited.



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subsidiaries

AMERICAN GEAR & MFG. CO. • Phone: Lemont 920 • Lemont, Illinois

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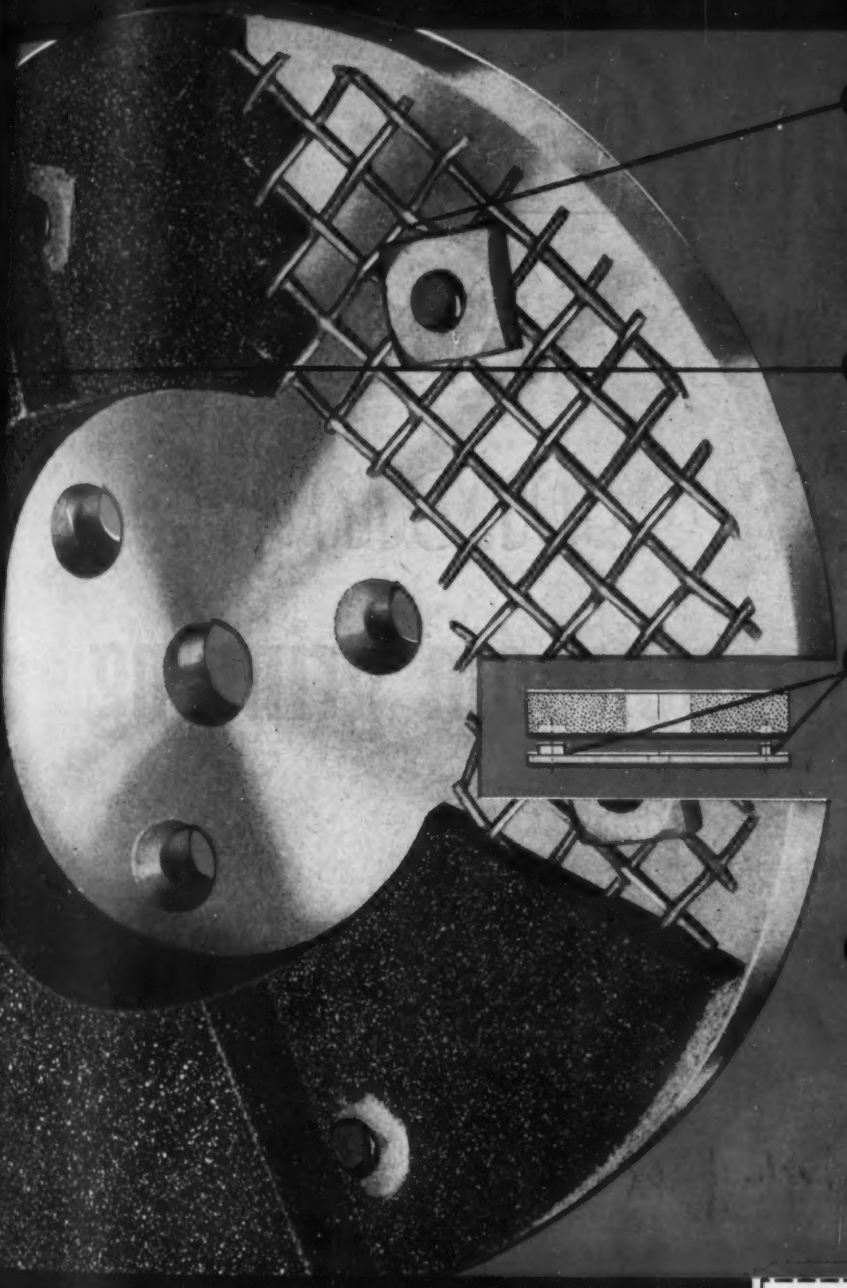
Compare the Exclusive Features

of This Abrasive Disc With Other Makes



1 WIRE-LOKT CONSTRUCTION for positive safety

Heavy wire mesh is molded as an integral unit with abrasive. Provides maximum protection for operator.

2 JOB-FITTED ABRASIVES at no extra cost

Abrasives compounded to fit needs when necessary. Production records permit exact duplication for reorders.

3 TRU-LOK DISC MOUNTING for maximum precision

On GARDNER discs provided with the Tru-Lok feature, off-center mounting is impossible. Doweled Tru-Lok mounting aligns the holes in the abrasive disc and steel wheel exactly.

4 FIELD ENGINEERING SERVICE

A nation-wide service organization available to help you solve your flat surface grinding problems. Helps you obtain maximum efficiency and service from abrasive discs and equipment.

GARDNER *abrasive discs*

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Beloit, Wisconsin 104A

Please send me a free copy of the Gardner Abrasive Disc Guidebook.

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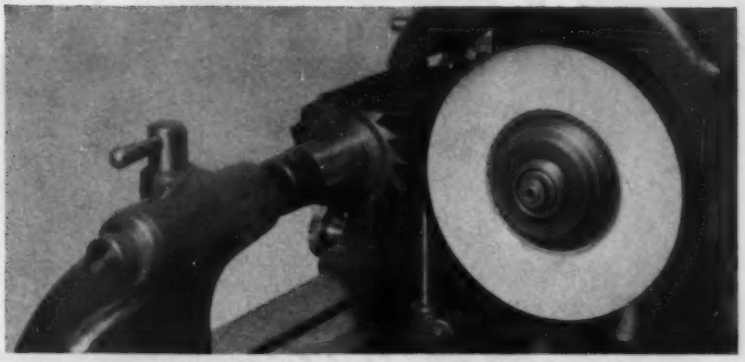
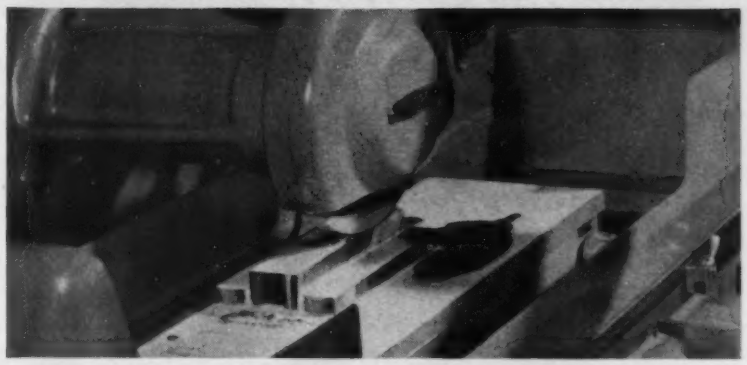
See how Norton New-Process Wheels bring new efficiency... new economy... to your toolroom grinding

MOST UNIFORM WHEELS EVER PRODUCED!
Manufactured under constant quality control, Norton *New-Process* Wheels are truly uniform within themselves and from wheel to wheel — unmatched for inherent balance and grinding efficiency in the entire abrasive field.

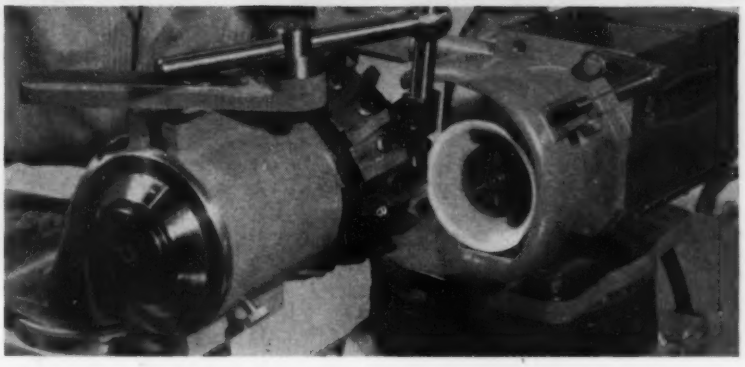
You get:



IMPROVED GRINDING OPERATION. The more uniform structure of Norton *New-Process* Wheels assures even wear. That means fewer machine adjustments and longer wheel life. And you can count on identically marked wheels for identical top performance.



IMPROVED RESULTS. You can grind to closer tolerances and smoother finishes with *New-Process* Wheels. Vibration is reduced and chatter marks are eliminated — thanks to their built-in balance that lasts for the entire life of each wheel.



IMPROVED TOOL MAINTENANCE. With Norton *New-Process* Wheels you can take heavier cuts on expensive high-speed steel and cast alloy tools without drawing tempers or risking spoilage. Tools stay sharp longer — and last longer — for added savings in toolroom operating costs.

AVAILABLE IN A RANGE OF ALUNDUM* ABRASIVE TYPES

New-Process Wheels are made in various types of fast cutting, cool cutting ALUNDUM (aluminum oxide) abrasive — Regular ALUNDUM, 19 ALUNDUM, the new and outstanding 32 ALUNDUM, 38 ALUNDUM, 57 ALUNDUM — for best results in every toolroom application, from general grinding to high precision work. *New-Process* ALUNDUM Wheels (made in sizes up to 14") are also ideal for many other grinding jobs on hardened steel and materials of high tensile strength.

YOUR NORTON DISTRIBUTOR CAN SAVE YOU TIME AND MONEY

There's no room for guesswork in grinding wheel selection. Your Norton Distributor *knows* which type and size of wheel is best for each job. And if your problems are unusual, he'll call in a Norton Abrasive Engineer for additional expert advice. See him for exactly the *right* Norton Wheel for *any* grinding operation.

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162 Pages Of Cost-Saving Facts on toolroom grinding are contained in this booklet. Get a copy from your Norton Distributor or write direct for Form 835.

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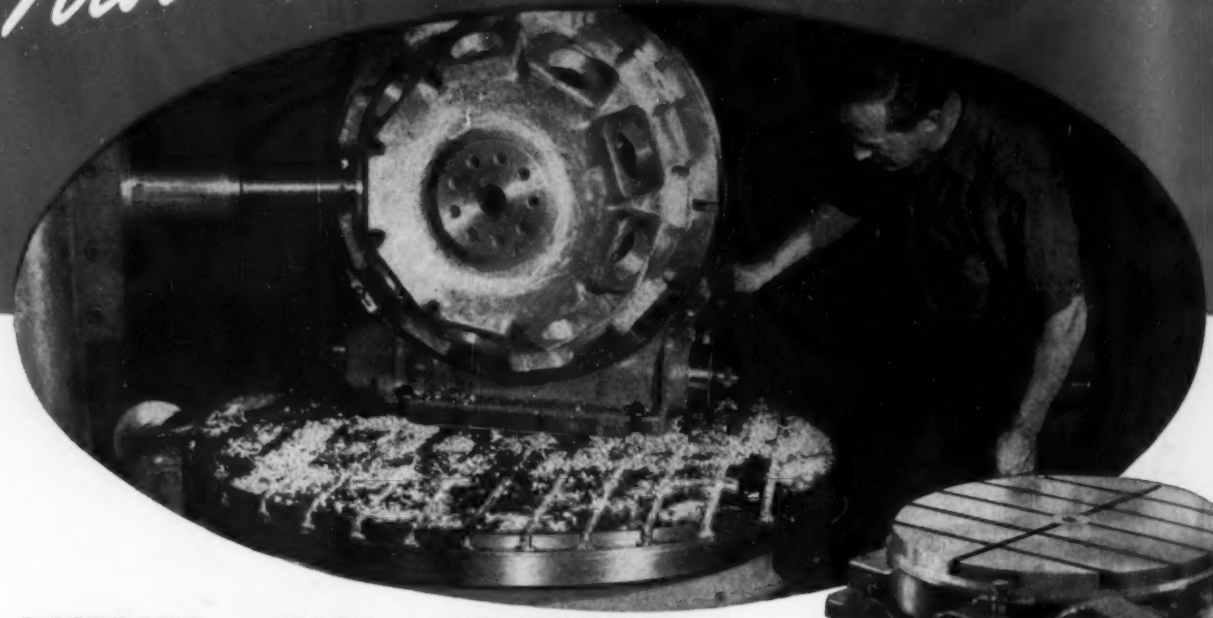
Making better products to make other products better

PRATT & WHITNEY

Rotary Tables

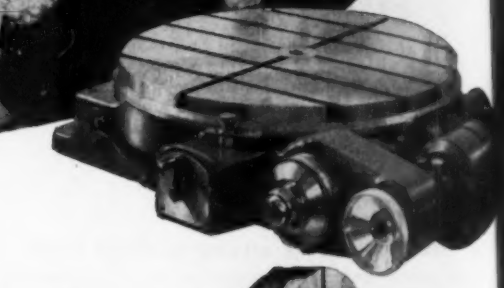
First Choice FOR PRECISE CIRCULAR SPACING AND ANGULAR POSITIONING— 10 inch TO 50 inch DIAMETER

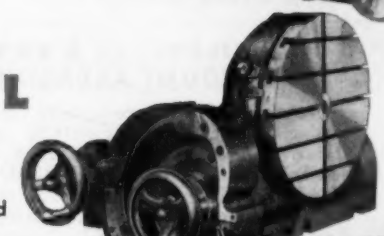


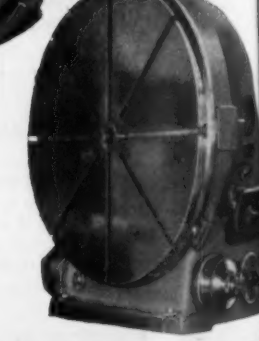
ACCURATE • FAST • ADAPTABLE

3 Basic Types

PLAIN
TILTING
VERTICAL







Pratt & Whitney Rotary Tables produce highly accurate work . . . faster, more efficiently and with definite assurance of "job precision." Indexing at simple or compound angles is obtained rapidly and easily for drilling, tapping, boring, reaming and face milling operations and for stage and final inspection checks. Every P&W Rotary Table is machined, assembled and inspected to rigid standards of accuracy.

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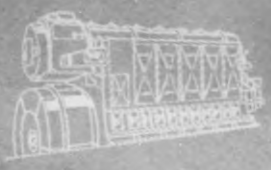
Put Your Power Costs and Performance in Order



1 ***Handle Peak Demand*** **...reduce peak demand values for lower purchased power rates.**

2 ***Power Factor*** **. . . in-plant power generator can eliminate power factor penalties.**

3 ***Emergency Power*** **. . . insurance against lost production and damage resulting from line failures.**

4 ***Handle Surge Loads*** **. . . that may now be affecting current characteristics of entire plant.**

5 ***Plant Expansion*** **...need not be restricted due to lack—or expense—of ample power.**

6 ***Useful Heat*** **. . . lube oil, water and exhaust heat can be turned from waste to profit.**

7 ***Chemical Value*** **. . . exhaust gases are high in free nitrogen—available for economical fixation of nitrates, ammonia, etc.**

8 ***Insurance Advantage*** **. . . of diesel over gasoline engine, for example, will soon pay for installation.**

9 ***No Weather Worries*** **...ice, snow, sleet, wind storms can't stop plant operations.**

10 ***Handle Increasing Load*** **. . . in-plant power economically adds to current capacity as loads increase.**

11 ***Fuel Economy*** **. . . use diesel oil, natural gas or sewage gas for added economy.**

12 ***Remote Locations*** **. . . distance from transmission lines needn't curtail plant expansion.**

13 ***More Compact Power*** **. . . Fairbanks-Morse engines give you more power per foot of floor space, more power on present foundation.**

14 ***Minimum Attendance*** **. . . Fairbanks-Morse in-plant generating sets require far less supervision or maintenance.**

15 ***Save Cost*** **. . . of running in new line where present transformers and power lines are already loaded.**

FAIRBANKS-MORSE DIESELS CAN BE YOUR

Power Keys

Here are the keys that have opened the way to adequate, reliable power for many plants — small and large. They have eliminated the penalty paid due to poor power factor, surge loads and adverse current characteristics.

But, Will They Fit Your Problem?

Look at the list! Would compact in-plant power generation unlock your plans for plant expansion . . . eliminate the need of using purchased power at rates based on *high* peak demand values . . . add to current capacity? The answer is yes—and it can mean the difference between profit and loss in your plant.

If you are seeking the keys to your power problem, write us today, outlining your needs. Fairbanks-Morse engineering can give you a *proved* answer . . . based on over 50 years' experience in industrial and municipal power generation. Fairbanks, Morse & Co., Chicago 5, Ill.

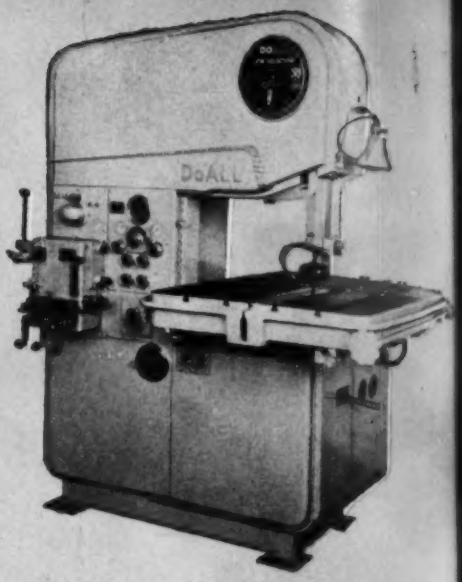
FAIRBANKS-MORSE,

a name worth remembering when you want the best

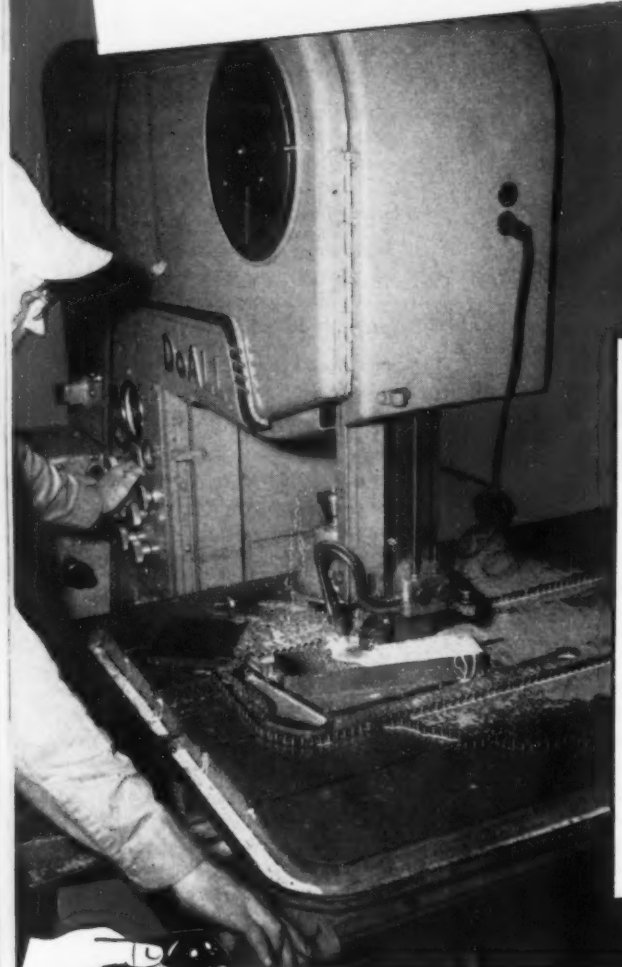
DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • ELECTRICAL MACHINERY • PUMPS • SCALES • RAIL CARS • MAGNETOS • FARM MACHINERY

YOU CAN BENEFIT FROM DO

Use the DoALL method for fast low cost machining. Shape and save all types of material. Release larger expensive tools for more profitable operations.



DoALL CONTOUR-MATIC—Finest, most useful band machine built. Variable tool speed 40 to 10,000 feet per minute. Saws, files, polishes, grinds, hones, slices all materials. Hydraulic operation with finger tip controls delivers increased production at lower cost.



BAND TOOLS FOR EVERY PURPOSE

—precision, buttress, claw tooth, spring temper and friction saw bands; line grind, diamond and file bands; scallop edge, spiral edge and knife edge bands; abrasive bands. Ask for catalog.

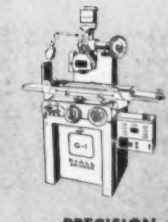
DoALL'S PAY IN PRICED AS LOW AS

WHATEVER your band machining requirements, you can find the right model in the DoALL line. There are standard machines to meet almost every conceivable requirement: seven frame sizes; five throat sizes; speeds from 40 to 15000 f.p.m.

There is a fixed speed, 16" throat *Utility* bandsawing machine for only $350. There is a combination bandsawing, filing and polishing *Utility* model having a dual variable speed range and attached saw blade welder for only $750—*the biggest bargain available anywhere in a band tooled machine.*

There are the big, high speed DoALL *Zephyr* machines, to handle work loads weighing a ton or more and with Hydro-Feed tables for fast, labor-saving production.

The DoALL *Contour-matic* is unmatched in operational scope, quality of work and productivity.



PRECISION SURFACE GRINDERS

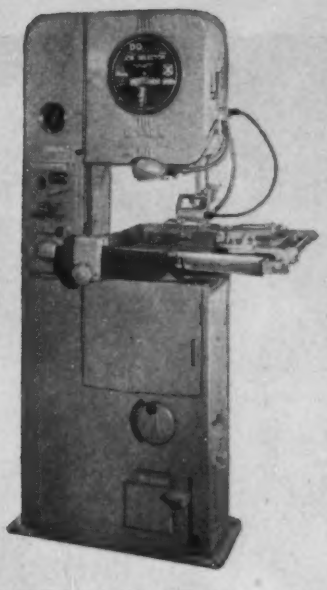
GAGE BLOCKS

GAGING EQUIPMENT

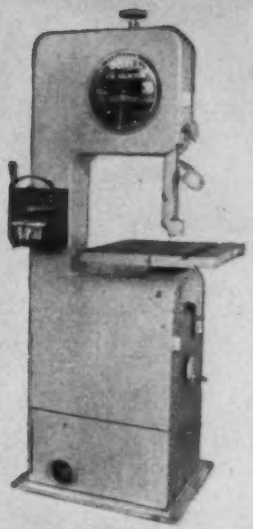
MOBILE INSPECTION

DoALL BAND MACHINING!

DoALL "ZEPHYR" MACHINES—For safe high speed sawing, up to 15,000 feet per minute. Widely used for Friction Sawing. Single or variable speed models—16" to 60" throat capacity. Pedal operated or automatic brakes optional on high speed machines.



DoALL CONTOUR MACHINES—For precision bandsawing, filing and polishing in every type of metal working shop. Effortless and precise control of speed and feed result in exceptionally efficient operation and reduced tool cost. Available in 16", 26", 36" or 60" throat capacity with work height under guides as required.



DoALL "UTILITY" MODELS—Light duty low cost bandsawing machines. Fixed speed for plastic or woodworking—variable speeds for more effective and economical metal sawing, filing or polishing. A dual range model combining both high and low speed control is a natural for experimental work on different materials.

IN ANY SHOP . . . AS $350

DoALL *Contour* machines are work horses of the metal shop, handling hundreds of conventional cutting jobs with accuracy and speed.

And, there are special production machines built to order for high output on your special applications.

No matter what your job, there is a DoALL Band Machine to handle it. Call your local DoALL Sales-Service Store or write:

The DoALL Company
254 N. Laurel Ave., Des Plaines, Ill.

"Band Machine Headquarters"

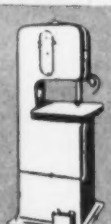
ASK FOR CATALOGS

DoALL

DoALL Mobile demonstration units will bring a DoALL Band Machine right to your plant and demonstrate it on your work. There is no cost or obligation. Simply "Call DoALL" locally, or write to DoALL at Des Plaines, Ill.

8-15

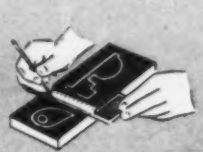
BLADE WELDERS


BAND FILERS

BENCH FILERS

TOOL GRINDERS

TOOLMAKER'S LATHES


TOOL STEEL

HELP YOURSELF...to TWO

In the hands of the CARBORUNDUM engineer, the new "61" Port-A-Belt Grinding Attachment...on the desk, the new "T-61" Hub Wheel assembly.

Look to CARBO

TRADE

"Carborundum" and "Port-A-Belt" are trademarks of The Carborundum Company, Niagara Falls, New York

VO BRAND-NEW abrasive ideas!

Within the past thirty days, two entirely new concepts in grinding have been brought to you through CARBORUNDUM engineering. Backed by long months and years of design and development work, these new techniques are now ready to go to work, earning a bigger profit for you.

You can profit by both of these brand-new developments—for they have been created with just one purpose in mind... to cut your grinding and polishing costs to the bone. Both new products happen to apply to abrasive *belt* performance—the "61" Port-A-Belt which now makes portable belt grinding a reality—the "T-61" Hub Wheel which can cut contact wheel replacement costs in half. Next month, the headline development might be a new abrasive *wheel.* That's the tremendous and exclusive advantage you enjoy in doing business with CARBORUNDUM. Offering *all* abrasive products, we have just one axe to grind... yours!

Here are only a few of the 30,000 reasons why you get the RIGHT combination of abrasive and method only from CARBORUNDUM

You benefit when you call in your CARBORUNDUM or distributor salesman on any abrasive problem you have. Nowhere else can you get the unbiased counsel you have a right to expect. You'll find him listed in the yellow pages under "Abrasives." Call him today—it's to your profit!

RUNDUM

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for the NEW developments in ALL abrasive products

80-55

A RING OF PRECISION IN EVERY ONE

...A SIZE TO FIT EVERY NEED
...TO MEET SPECIFICATIONS

Pressure Vessels
Forgings and Rings
Hardened and Ground Steel Rolls
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Ordnance and Armor

Measurement is only one type of precision in Midvale rings. The steel for every ring is made by Midvale—physical properties are precisely maintained throughout every step. The shaping and heat treating of Midvale rings are done by "old-hands"—craftsmen with years of experience who precisely machine and test with the most modern metal working and scientific equipment.

Result—rings precision-made in every detail . . . rings that stand the severest abrasive, crushing and grinding action called for by industry.

Whatever your needs for heavy equipment in industry Midvale can assure you of precision and performance. Whether it is roll shells for the mining and cement industry . . . pressure vessels for the chemical and petroleum industries . . . rolls for the paper industry . . . rings for turbines and gears . . . or castings and forgings for any industry . . . Midvale can make them to your most exacting specifications.

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MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Gates V-Belts are chosen to keep HELICOPTERS aloft!

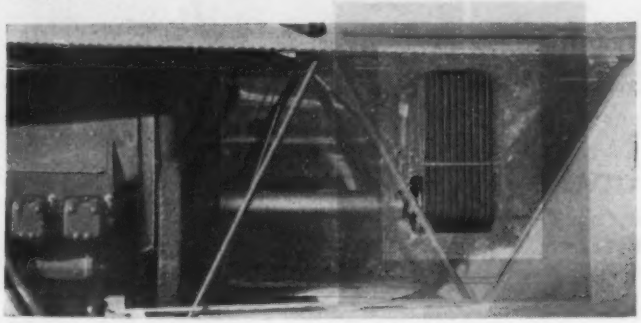
McCulloch Tandem-Rotor Helicopter

(Above) Two-place helicopter employs tandem-mounted, intermeshing rotors—a total of six rotor blades—powered by a 200-hp, six-cyl., aircooled horizontal engine installed at the rear. (Lower left) Gates-engineered V-BELTS, shown to rear of the engine, transmit power from the engine to the main drive shaft which in turn drives the reduction gearing for the rotors.

Because a helicopter is air-borne entirely by the turning of its rotors, McCulloch Engineers who designed this helicopter and supply it to the Navy had to be sure that the drive to the rotors was, above all, safe and reliable—a drive that would not fail when the helicopter was in the air.

The special difficulty in designing this drive was the extreme *compactness* required.

On small diameter pulleys and short center distances, the drive must handle 200 horsepower for 1000 hours at cruising speed and 500 hours at high speed. Ordinarily, it would have been impossible to achieve these results.



A Notable Application of Gates SPECIALIZED Research

However, Gates had developed a V-Belt which in thousands of applications had proved to have the exact characteristics required for this helicopter drive—and Gates had also developed design data which showed at once the applicability of this belt.

It was not by accident, therefore, that Gates Engineers were at once prepared to supply a V-Belt capable of handling this most exacting assignment and —in close co-operation with McCulloch Engineers—they developed the drive shown which has most successfully met all requirements.

Gates readiness to meet successfully *any* V-Belt Drive assignment is possible because Gates runs an *average* of 32,000 hours of testing *every week* on V-Belts alone! (32,000 hours is equivalent to *five years* of life for one belt.)

And the real value to you of such exhaustive testing is this: Laboratory findings are carefully checked by tests made under actual field conditions and the *results* are at once reduced to *usable data* for the design of V-Belt Drives to *perform whatever task may be required!*

Phone for a Gates Field Engineer

If you have a difficult drive to design, or if some drive in your plant is giving trouble, or if you only want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on any particular drive—you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

ENG-522

Gates VULCO ROPE DRIVES

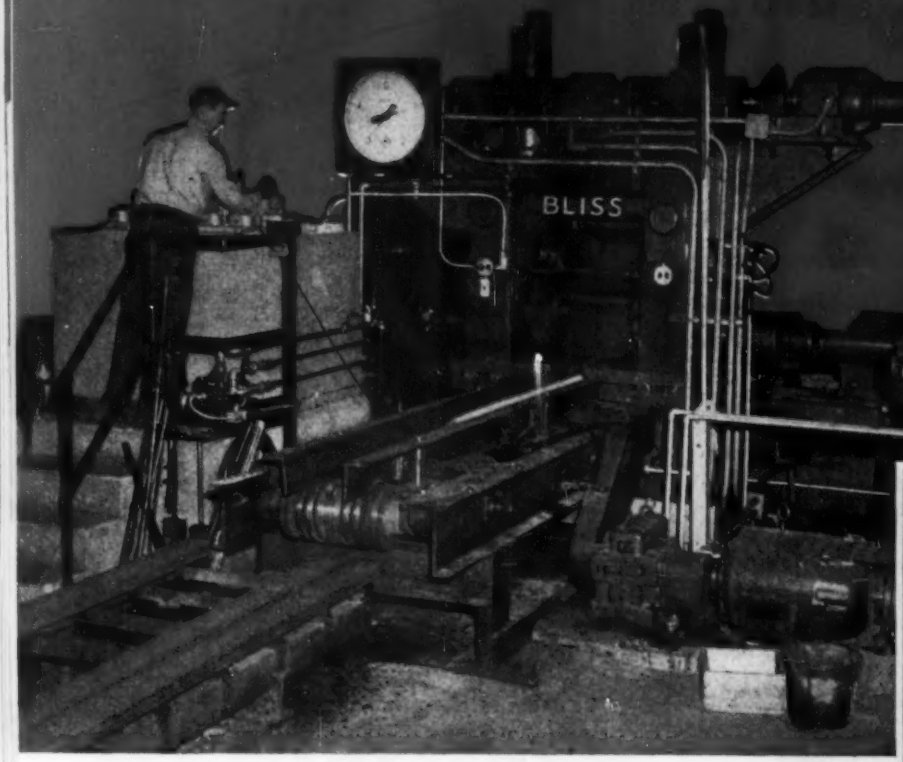
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY

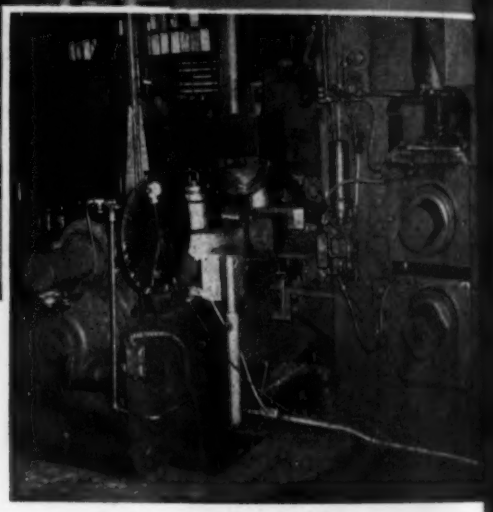
DENVER, U. S. A.

The World's Largest Makers of V-Belts

Ohio Knife trims rolling time 50% with New BLISS Hot Mill and Edge



Laminated metal, with soft s
side core surrounded by hard
loy steels, is hot rolled in th
Bliss 19" x 24" Two-High Reve
ble Mill powered by an AC moto



Combination of mill, edger and run-out table reduces material-handling manhours by 80%

Proof that the right combination of equipment and methods can contribute startling performance exists at the Ohio Knife Company of Cincinnati. Here, a new Bliss Two-High Mill and Edger hot roll 5" square stock in six passes to 3⅞", holding tolerances within ±0.005". Aside from mill accuracy on daily production runs of as long as 20 hours, Ohio Knife Company officials report that rolling time has been reduced 50%; and material-handling time, 80%.

Recommending designs and methods for efficient metal rolling has been the job of Bliss Rolling Mill Engineers for nearly fifty years. Examples of advanced Bliss mill engineering can be found in many steel, brass, aluminum and specialty plants. Consult Bliss on your next rolling mill equipment problem. And write for our 52-page brochure: "Bliss Mills and Accessories."

E. W. Bliss Company, General Office: Canton, Ohio
ROLLING MILL DIVISION: SALEM, OHIO
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo and Toronto, Canada. West Coast Representatives: Moore Machinery Company, Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

Remember:

for Presses, ROLLING MILLS, Special Machinery... **It's Bliss**

Rheemcote Process Gas-fired oven at New Orleans plant pre-heats, bakes and cools sheet finishes at 4,200 per hr. rate.
Rheem Manufacturing Company's giant metal offset press lithographs 3′x6′ sheets of 18-gauge steel at a 4,200 per hr. rate.
Rheem
color lithography on metal
depends on GAS for processing
at Rheem Manufacturing Company

Rheem Manufacturing Company's engineers worked with engineers of Wagner Litho Machinery Division to develop the GAS oven and related equipment necessary to lithograph and fabricate 55-gallon steel drums.

18-gauge steel sheets, 3′x6′ are fed into the giant offset press at a maximum speed of 4,200 per hr. After printing and coating, the sheets travel through a Gas-fired 210′ oven to be dried:

Pre-heat zone: 200°-275° F. for 6 min.
Baking zone: 175°-450° F. for 15 min.
Controlled cooling zone for 7 min.

After lithographing one side and lining the other, sheets are fabricated into steel drums. This Rheemcote Process permits users to identify their products in drums with familiar, colorful trade-marks. Liquid and solid materials and chemicals are shipped all over the world in these Brand-name drums.

The Rheemcote Process is an example of how GAS can be used to meet specialized problems in a production line. Gas is the ideal fuel to use, because Gas temperatures are readily controlled automatically, because Gas is clean, efficient, and economical. Whatever your requirements, learn how GAS can serve you. Call your Gas Company Representative today for the facts.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

instantaneous control

Only P&H AC Welders have this feature

for faster, easier, sounder welds on non-ferrous and "hard-to-weld" metals

No other welder has this Instantaneous Control feature. Foot-operated, the control provides the heat you call for instantly, *electrically* — not mechanically. No time lag. It's a P&H exclusive that boosts production, cuts costs, saves time.

Inert Gas Welding

Instantaneous control lets you handle "hard-to-weld" metals with ease — aluminum, magnesium, brass, copper, stainless, high carbon, high alloy, and low carbon steels. You get sound welds — X-ray quality every time. No burn-throughs, fewer rejections.

Operators like it, too. It gives them faster, better welds in only five simple steps. Check them:

1. Foot switch automatically turns on power, high frequency, water and gas.
2. Arc starts *instantly* without touching work.
3. Foot switch control provides exact heat needed *while* welding — *no time lag.*
4. Foot-operated control cuts power either gradually or instantly at completion of weld. Eliminates craters — no scrap pieces needed to run out bead.
5. Gas and water shut off automatically according to pre-set time delay.

Compare AC Inert Gas Welders, point by point, and you'll buy P&H. Check these outstanding features:

- **P&H Dial-lectric Control** — No moving coils or cores to bind or freeze. Maintenance is absolutely negligible.
- **Built-in high frequency unit** — eliminates additional external equipment. Variable frequency control.
- **Automatic gas and water control** — Pre-set automatic time delay control (2 seconds to 2 minutes) prevents electrode contamination, assures clean, sound welds.
- **Stepless amperage regulation** — from 10 amps to maximum. Three models available — ranges 200, 300 and 500 amps.
- **Unusual arc stability** — Makes good clean welds where extremely low amperages are required.
- **Selector switch** — gives operator instant choice of standard or high frequency unit.

No wonder P&H Inert Gas Welders are the choice of the aircraft industries where top quality work and speed are "musts". They join "hard-to-weld" metals faster and easier — eliminate rejects for you, too. Get full details from your P&H representative or write us for further information.

P&H

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3428

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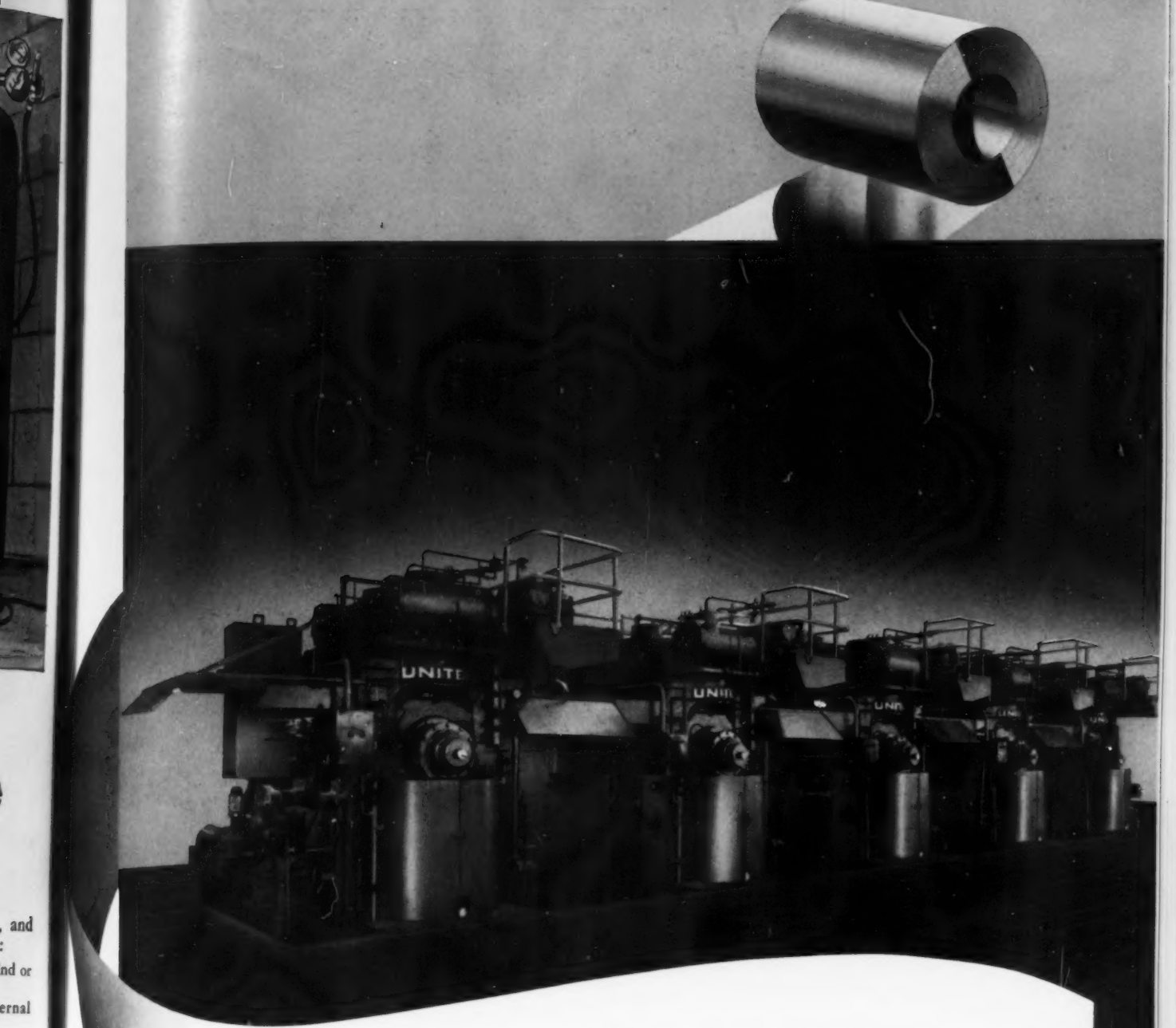

UNITED

5-stand Tandem
4-high Cold Mill

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REG. T. M.

8000 reasons why Goldens' like the Warner & Swasey 1-AC

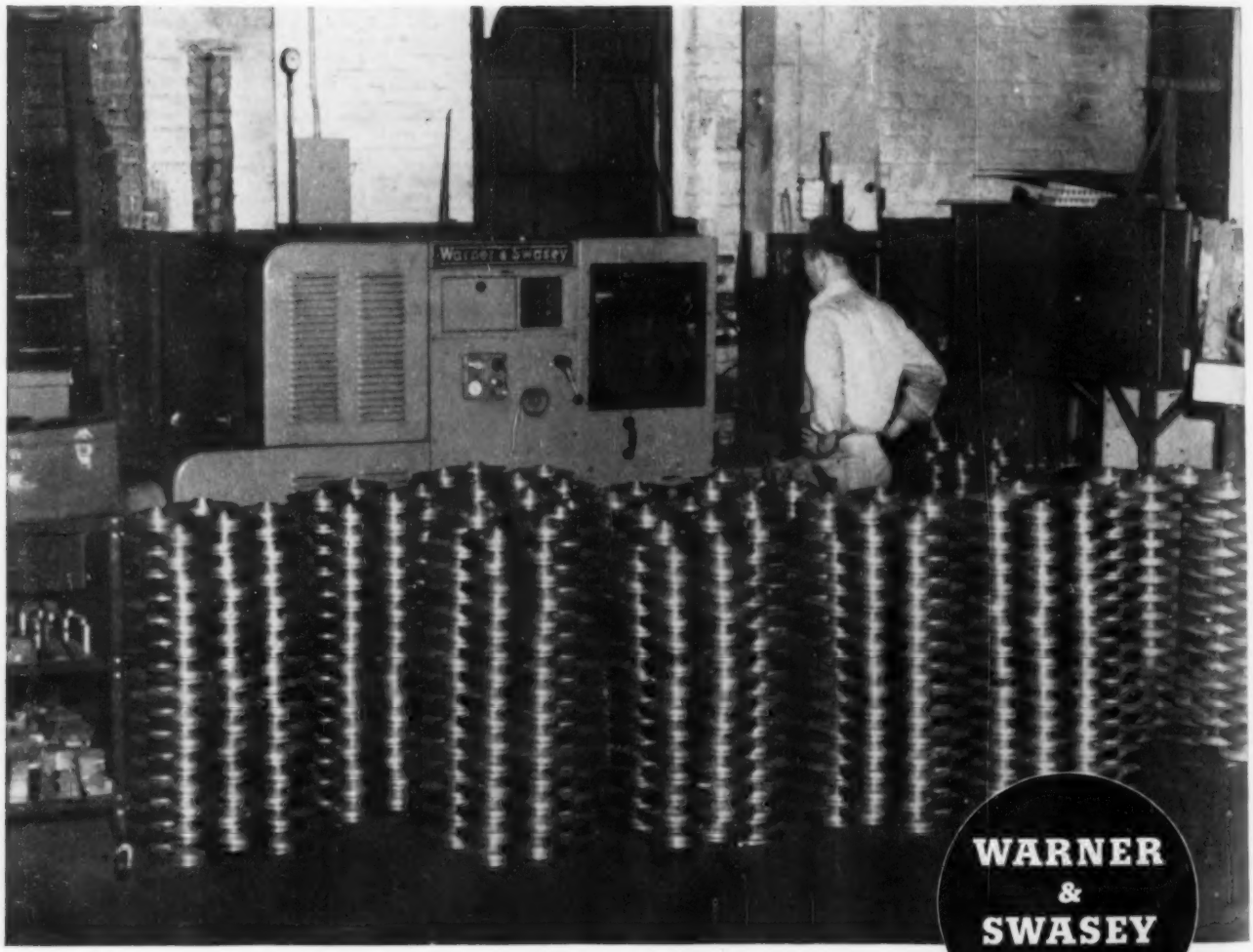
● The pulleys shown in the picture, part of an 8000-lot run, might not have been possible at Goldens' Foundry & Machine Company of Columbus, Georgia, if it had not been for their new Warner & Swasey 1-AC Single Spindle Automatic.

Bought originally to produce parts in quantities of 100 to 700, the 1-AC did that job well . . . far surpassed production over previous hand-operated methods, and with accuracy of six ten-thousandths of an inch in the bore.

It was then that a bid on an 8000-piece pulley job was being let. This was a high priority job requiring quick delivery. Goldens' was low-bidder and, with the 1-AC, were able to meet the delivery date—both of which would have been impossible with their previous hand-operated equipment.

The 1-AC is opening up profitable new fields for this company—paying itself off fast.

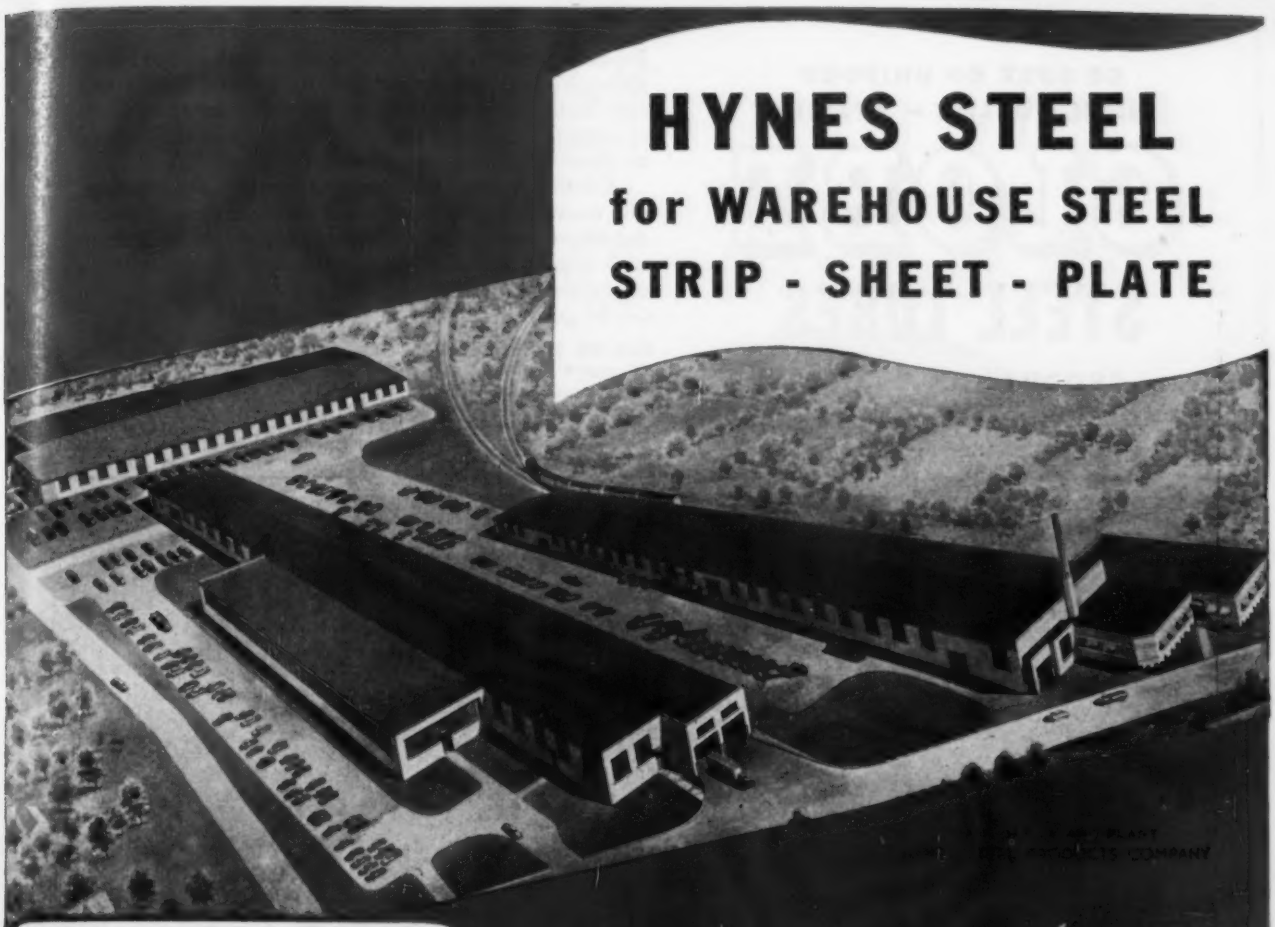
Project the possibilities of the 1-AC into your own plant, your own market. Your Warner & Swasey Representative will be glad to help.



WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

HYNES STEEL
for WAREHOUSE STEEL
STRIP - SHEET - PLATE



HOT ROLLED, PICKLED & OILED & COLD ROLLED STRIP STEEL

SIZE RANGE

Slit Edge-Coils
11 ga. (.125) to 28 ga. (.015)
1/4" to 24" wide

Slit Edge-Cut Lengths
7 ga. (.187) to 26 ga. (.018)
3/4" to 24" wide

Round Edge-Coils or Cut Lengths
11 ga. (.125) to 16 ga. (.062)
3/8" to 3" wide

Deburred Edge-Coils or Cut Lengths
11 ga. (.125) to 24 ga. (.025)
3/8" to 3" wide

Shearing Sheets and Plates
up to 3/8" in thickness — 12' lengths

Our complete facilities are devoted to the warehousing and processing of steel in sheet, strip and plates.

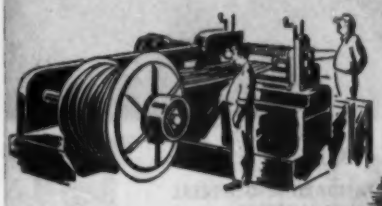
Hynes has the most modern equipment for shearing, slitting, edge rolling, roller leveling and cutting to length.

Normal inventory includes Cold Rolled Strip and Hot Rolled Strip in Coils and Cut Lengths, Hot Rolled and Cold Rolled Sheets and Hot Rolled Plates.

Non-ferrous metals can be processed to your size and specification.

Twenty-six years of progressive growth and experience is at your service.

Check now on our warehouse stock. Phone, wire or write.



HYNES

BE SURE OF UNIFORM HIGH QUALITY — SPECIFY

GLOBE STEEL TUBES

...PRODUCT OF A LEADING AND SPECIALIZED PRODUCER

From the massive mill that pierces the white-hot billet, through every step in processing, to final checks and tests in the laboratory, Globe processes are *specialized* . . . specialized to give you high quality — uniformity of diameter, concentricity, wall thickness.

Globe has *specialized* in the research, engineering, and manufacture of steel tubes for more than 30 years. Advanced machinery and methods — rigid inspection and quality controls — characterize all production operations from billet to finished tube. Write for the Globe general catalog.

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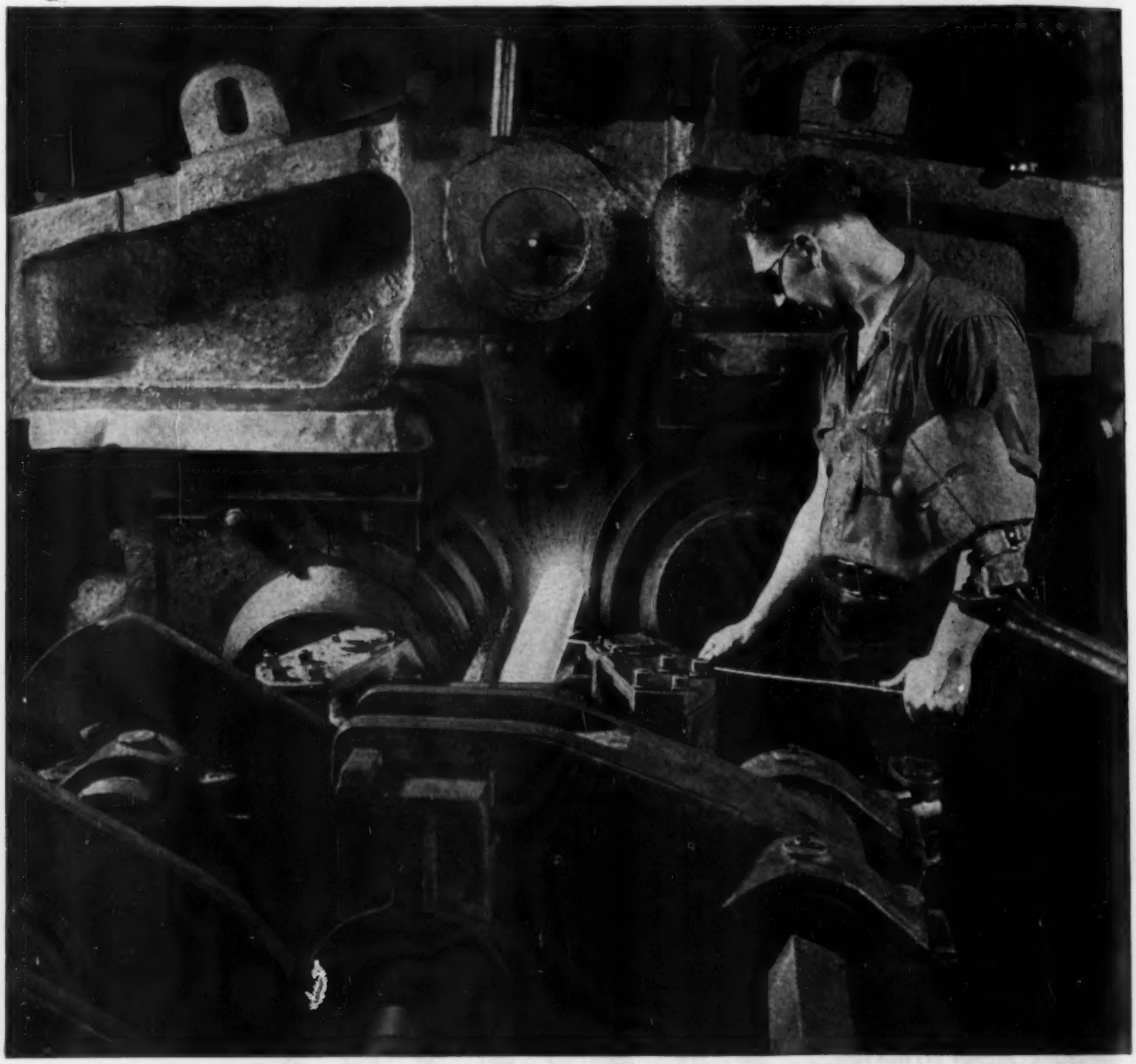
Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globe-iron seamless high purity ingot iron tubes — Globe Welding Fittings.



Globe Steel Tubes Are Available In:

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Freedom from leakage under pressure
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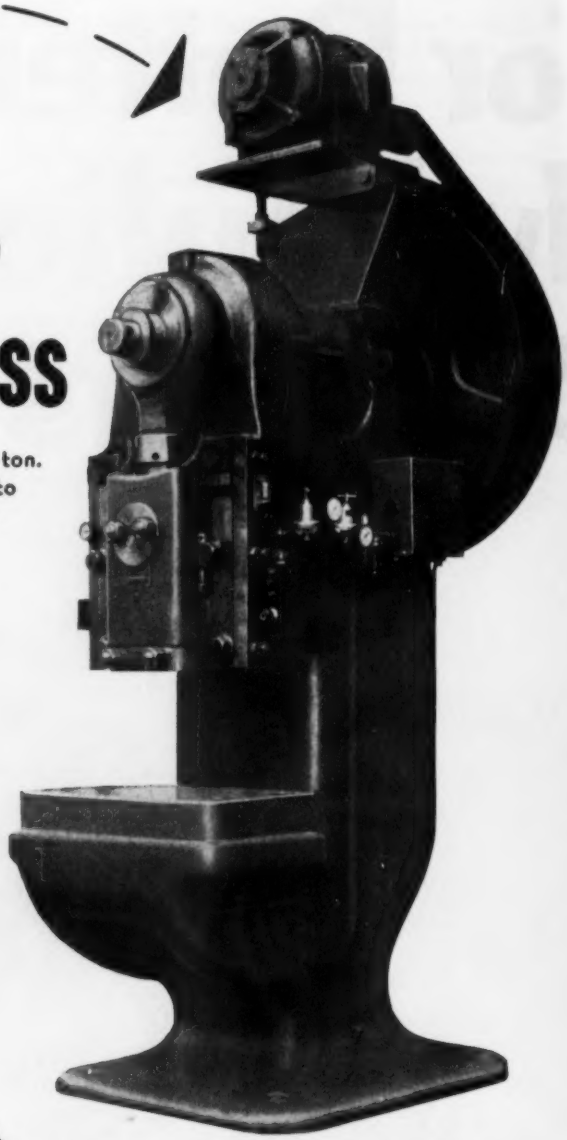
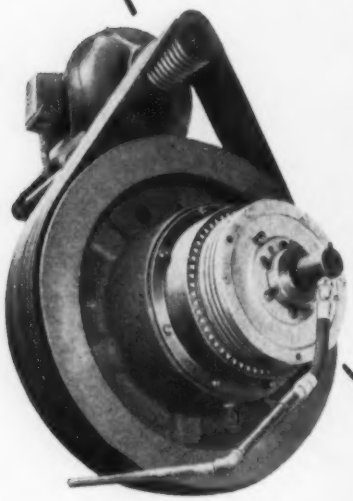
P for Prompt
P for Power
P for Production

FERRACUTE 'P' PRESS

Ferracute Press No. P6 100-ton. Other sizes from 20-tons to 150-tons. Prompt delivery on all models.





Ferracute "Power" Press No. P6 is equipped with air-operated, electrically-controlled FRICTION CLUTCH. Adjustable to continuous or single-stroke operation. Friction Clutches are available on all sizes.

Write or wire for full details of the complete line of Ferracute P presses.

FERRACUTE

FERRACUTE MACHINE CO.

Since 1863, Manufacturers of Power Presses and Special Machinery. BRIDGETON, NEW JERSEY

Typical of Ferracute P press *Production* is this steel blank for mowing machine blades. Stamped out of .123" high carbon steel, 180,000 P.S.I. at 100 strokes per minute.

"Dag" Colloidal Graphite... for Hot-Working Operations

At 500° F., and virtually as far up as you ever go in metalworking operations, **"dag"** colloidal graphite is a lubricant that does not gum up . . . that defies break-down. For brass, bronze, aluminum, magnesium, carbon steel and stainless steel . . . wherever your fabrication problems are friction and heat . . . this unusual lubricant reduces one and resists the other.

"Dag" colloidal graphite is available in dispersions designed to lubricate under all conditions of deep piercing, forging, stretch-forming, wire-drawing and ingot stripping . . . to assist in the parting of castings . . . to lubricate permanently parts that may be subject to extremely high temperatures . . . to be used in degreasing solutions which destroy ordinary lubricants.

When a **"dag"** dispersion is applied to the friction surfaces of metal it leaves a strong, durable graphoid film so thin that even the most sensitive gages cannot detect it. This lubricating film provides the metal with a surface that has an extremely low coefficient of friction . . . a lubricant that resists oxidation and functions far above the burning point of conventional petroleum lubricants.

For more information on the "Use of Colloidal Graphite for Metalworking Operations," write for Bulletin No. 426-13F.

dag DISPERSIONS®

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. . . also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

Units of Acheson Industries, Inc.

The close attention to detail in every production step at National is combined with our more than forty years experience in roll making and the metallurgical skill of our research and production staff to give you durable, dependable National Rolls.

The best proof of their dependability is their performance in *your* stands. Why not try them and see.

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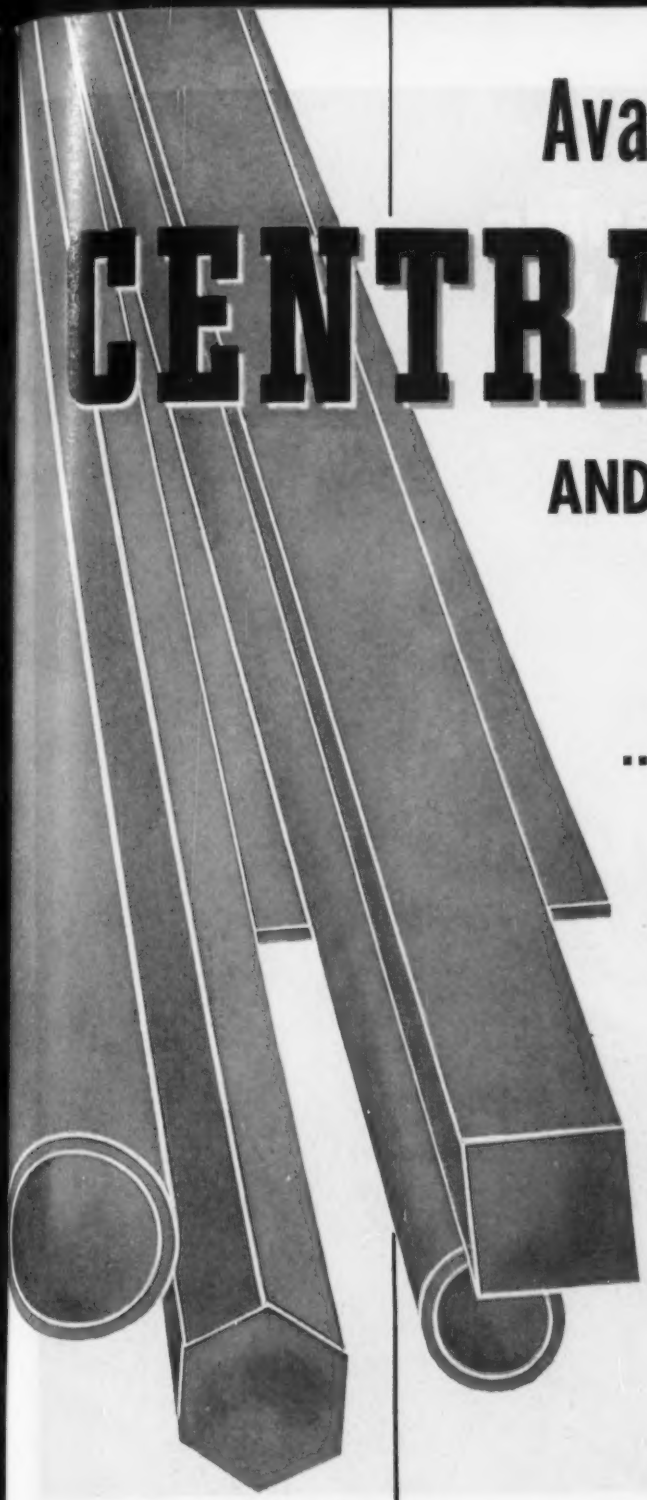
SPECIALISTS IN IRON AND ALLOY IRON ROLLS AND CASTINGS



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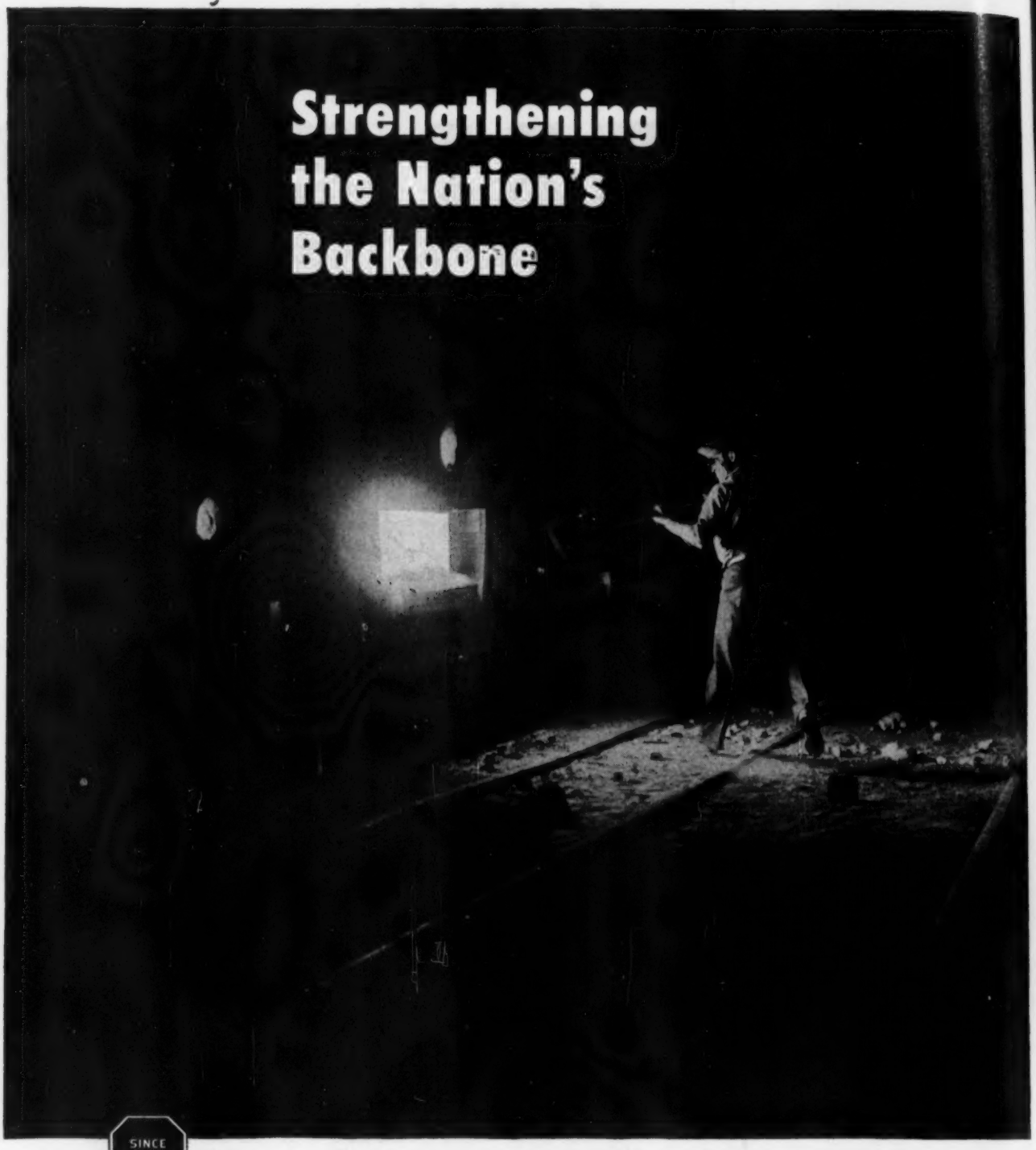
Strengthening the Nation's Backbone



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1878

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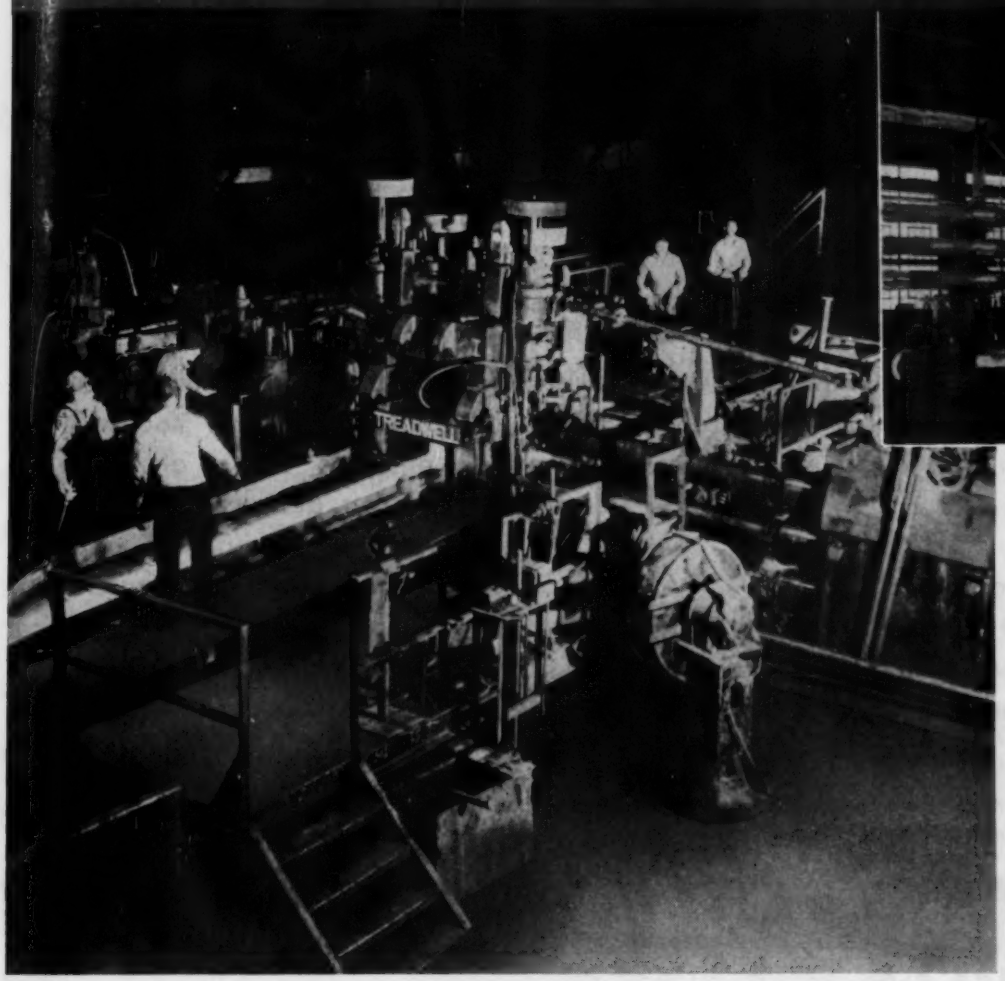
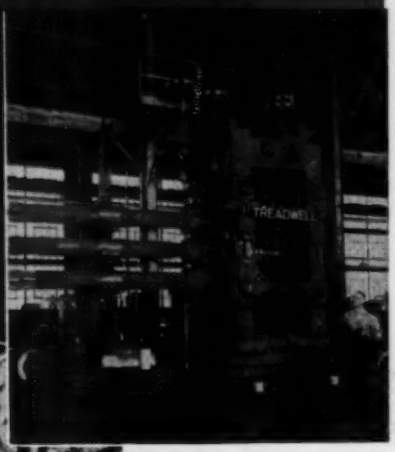
GRANITE CITY STEEL COMPANY, Granite City, Illinois

Treadwell





Shop view of the roll stand with spindles

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

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Conveyors, Coil
Drives
Ejectors, Furnace
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Steel and Iron Castings
Ni-Hard and Ductile Iron Castings

Three-High Mill for rolling precision rounds and squares up to and including 5" round or square. The mill is equipped with motor operated screw-downs for both top and bottom rolls.

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EASTON, PA.

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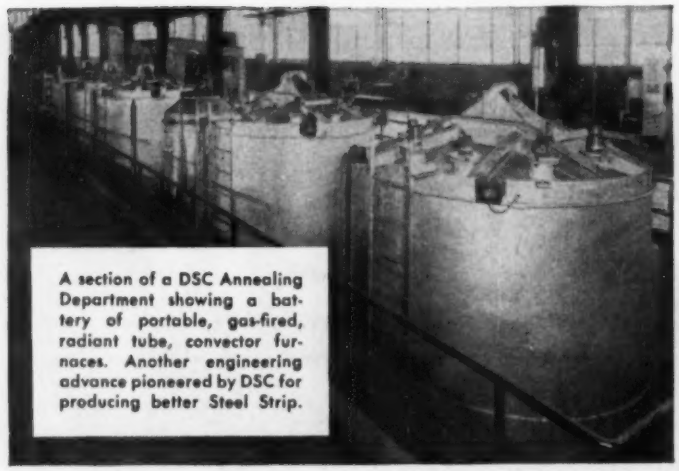

A section of a DSC Annealing Department showing a battery of portable, gas-fired, radiant tube, convector furnaces. Another engineering advance pioneered by DSC for producing better Steel Strip.

What you get *besides* width in RELIANCE Steel Strip

UNIFORMITY

STEEL STRIP is cold rolled steel that is *rolled and processed* to strip standards—not merely slit or sheared to a strip width, whether in coils or cut lengths.

Strip manufacturing practices give steel strip certain mechanical and surface properties not commonly available even in kindred products. . . . Perhaps the chief advantage of steel strip is its *uniformity*—uniformity of dimension, workability and finish. You will find this so on one-time orders and also on "repeat" lots. You get *uniform* individual parts, *uniform* components, and *uniform* final assemblies. You benefit from more efficient, more economical fabrication and more acceptable end-products.

DEPENDABLE DAN
T.M. REG. U.S. PAT. OFF.

Immediate delivery from warehouse stocks or shipped on short notice, in accordance with your own "prescription" direct from DSC Mills at Detroit or New Haven. For helpful action call our nearest plant or office.

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PRODUCERS OF
Coke and Coal Chemicals • Pig Iron • Ingots
Slabs • Sheet Bars • Billets • Wire Rods
Manufacturers' Wire • Merchant Wire Products
Welded Fabric • Cold Rolled Strip Steel

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DETROIT 9, MICHIGAN

RELIANCE STEEL DIVISION

Processors and Distributors JOB-FITTED Sheet and Strip Steel

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SHEETS
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Standard and Production Sizes or Cut to Actual Working Dimensions

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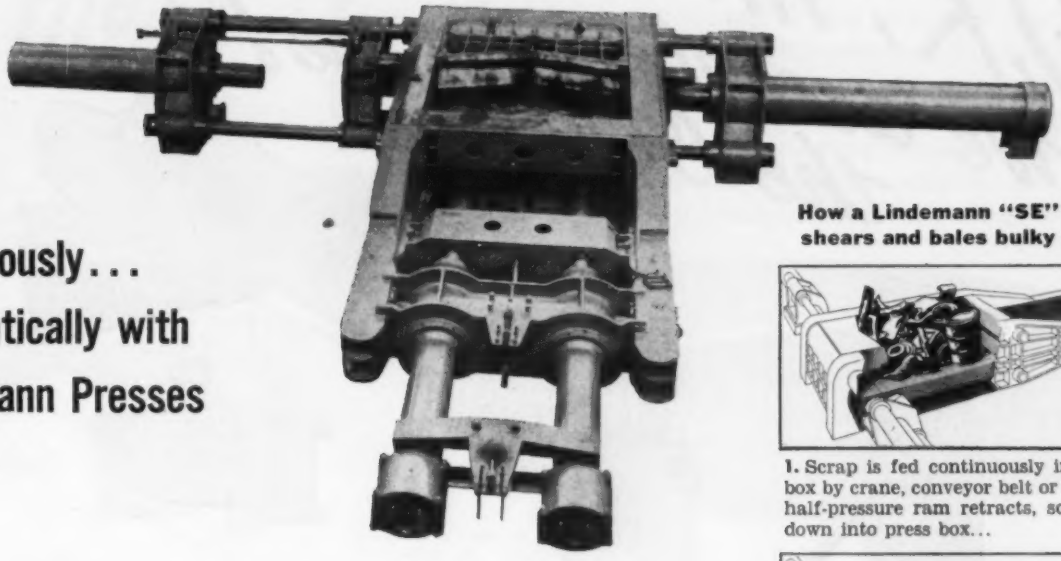
New, quick way to

shear and bale your bulky scrap



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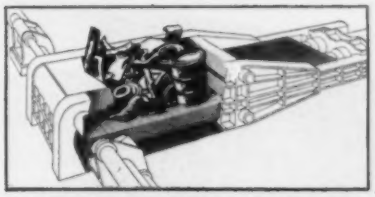
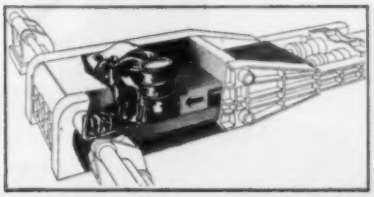
automatically with
Lindemann Presses

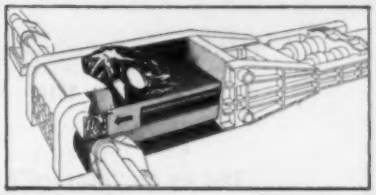
How a Lindemann "SE" Baler shears and bales bulky scrap



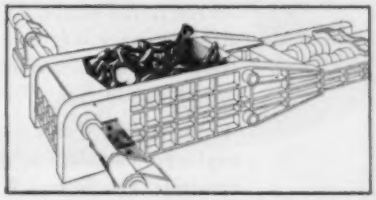
1. Scrap is fed continuously into press box by crane, conveyor belt or hand. As half-pressure ram retracts, scrap falls down into press box...



2. Half-pressure rams automatically move forward to exert first compression on scrap below cover plate.



3. Pieces of scrap above cover plate are cut off as ram blades close. Scrap below plate is forced into final compression chamber.



4. Scrap is compressed by final-pressure ram against counter-ram and ejected onto slide or conveyor belt. All rams retract and next baling cycle starts.

Keep scrap moving *quickly, economically* with Lindemann Baling Presses

Exclusive, patented shearing ram eliminates preliminary shearing or oxygen cutting.

Lindemann "SE" models *combine* the functions of a scrap shear and a baling press. They shear the scrap—compress it into dense, uniform bales—eject the bales onto chutes or conveyor belts—and do the whole job automatically!

If you handle large quantities of scrap—particularly if pieces are bulky or flow is continuous...

Just feed it into the press box of a Lindemann "SE" Baling Press. The machine will do the rest!

Press box sizes range all the way up to 79″ x 110″ x 20″. Models handle bale weights from 80 to 950 pounds, at an hourly rate of 100 for smaller bales—45 for the largest.

Ferrous and non-ferrous mills, automotive and metal-working plants, large scrap dealers can all use Lindemann "SE" models to good advantage.

LOOK INTO LINDEMANN PRESSING-LID BALERS, *TOO!*

There are Lindemann Pressing-Lid Balers specifically designed to meet the needs of open hearth steel works, blast and electric furnaces, automotive manufacturers and large and small scrap dealers. Tell us the amount and type of scrap you handle. We'll send you literature on the kind of Lindemann presses that will best fit your needs.

Replacement parts will be available at our Cleveland Service Center

KO CO. INC. INDUSTRIAL IMPORTERS

KURT ORBAN

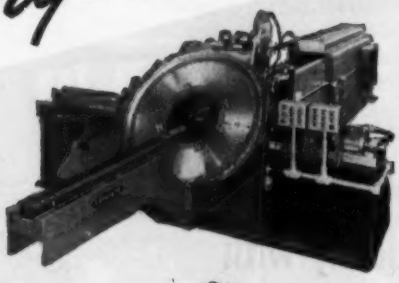
COMPANY, INC.

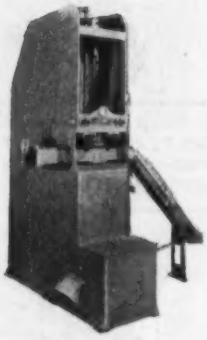
205 East 42nd St., New York 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit 35

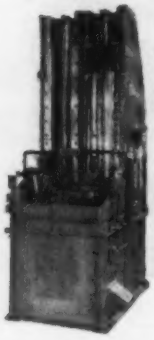
UR TIME STUDIES WILL PROVE

50 YEARS IN BROACHING

O.K. Industry... we accept the Challenge!







LAPOINTE

THE WORLD'S OLDEST MANUFACTURER

of Broaching Machines and Broaches,

is also the world's largest. Not every company that is oldest is the largest — but LAPOINTE happens to be one that is.

Did we say "happens"? It was no accident. It's the result of a *continuing challenge!*

50 years ago, with the founding of LAPOINTE, the broaching method of metal-removal was first offered to the world. Through broaching, repetitive accuracy was now possible, while at the same time accomplishing an amazing speedup in production.

When World War I came along, LAPOINTE engineers met the challenge of war production demands. The Second World War required even greater production, and the maintenance of still closer tolerances. Here again, LAPOINTE successfully met the challenge.

Today, under the intense pressure of an expanding defense program, industry has naturally turned once more to LAPOINTE. Jet engine components and certain other items could not be mass produced without broaching. We are meeting this challenge, as we did the others, with an impressive background of engineering experience in building broaching machines, tools and fixtures. *We can do the job . . . complete!*

Write for our *condensed Catalog No. 9*

THE LAPOINTE MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

Branch Factory: Watford, Herts., England

HUDSON LAPOINTE MASS.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

UR TIME STUDIES WILL PROVE

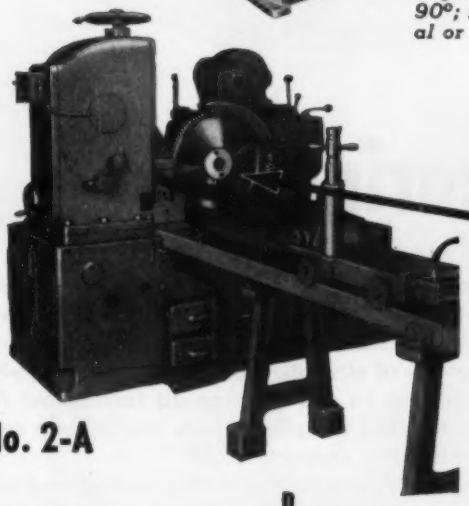
"It's the Cost per Cut that Counts!"

There's one economical way to cut off metal—by the Motch & Merryweather Triple-Chip Method. Speed, accuracy, square burrless ends, milled-finish pieces, — all contribute to profitable operation. Our wide experience in circular sawing covers all metals from magnesium to titanium. We are ready to demonstrate how the Triple-Chip Method will lower your costs.

No. 00-G

Material: S.A.E. 1020 tubing; 3" OD; .375 wall.
Production: 120 pieces per hour.
Tool Cost: $.0005 per piece.

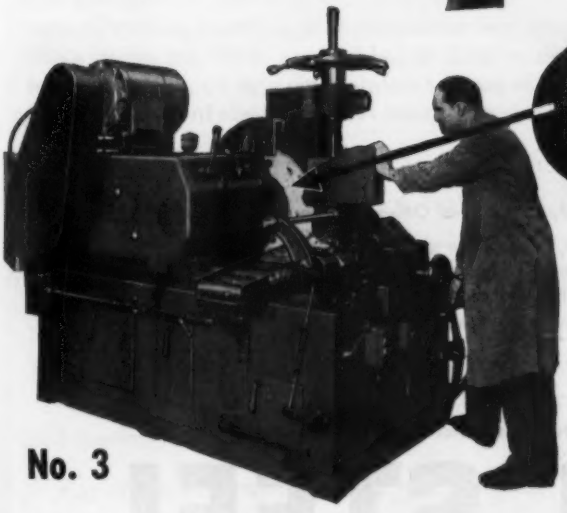
Capacity: up to 3" dia. at 90°; 2½" dia. at 45°. Manual or automatic stock feed.



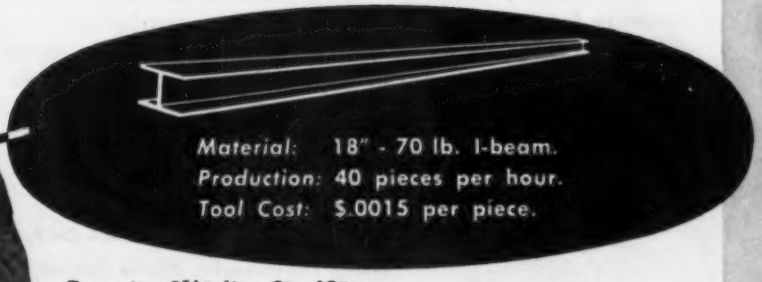
No. 2-A

Material: S.A.E. 1020, 5" dia.
Production: 60 pieces per hour.
Tool Cost: $.001 per piece.

Capacity: up to 6½" dia., 6" square. Manual or automatic stock feed.



No. 3



Material: 18" - 70 lb. I-beam.
Production: 40 pieces per hour.
Tool Cost: $.0015 per piece.

Capacity: 9⅜" dia., 6" x 18" rectangular shape. Manual or automatic stock feed.

Also 2 Still Larger Sizes:

No. 4 *Capacity:* up to 16½" dia.

No. 5 *Capacity:* up to 43" dia.

Manufactured by — THE MOTCH & MERRYWEATHER MACHINERY CO —

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

Only M & M builds ALL 3: CIRCULAR SAW SAW BLADE BLADE GRINDER

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

NOTE: Our stocks also include nickel-bearing stainless in a wide range of types for quick shipment subject to NPA controls.

Life-saver for Users of Nickel-Bearing Steels

If you are among those handicapped by government restrictions on nickel-bearing 18-8 stainless, large Ryerson stocks of straight chrome stainless may prove to be a life-saver. For example, many who formerly used type 302 sheets to meet mild corrosive action are finding a practical alternate in type 430. And this 17% chrome stainless is on hand now —ready for immediate delivery from your nearby Ryerson plant.

You can order type 430 sheets from Ryerson in all gauges from 10 to 26, in No. 2B or No. 4 finish—and in almost any quantity. You can also get quick shipment of these additional straight-chrome products: type 405 sheets—types 410 and 430 plates—and type 416 bars. It all adds up to the nation's largest stock of straight-chrome stainless. All with no restrictions on end use, but all time-tested Allegheny stainless of uniform high quality and definitely established characteristics.

In this stock, you may well find a steel that will enable you to maintain satisfactory quality in your product until nickel-bearing steels are again available. So now for stainless, we urge you to consider the versatile chromium stainless steels in Ryerson stock.

RYERSON CERTIFIED STEELS

WRITE FOR HELPFUL DATA—*On Type 430 and Other Chrome Stainless*

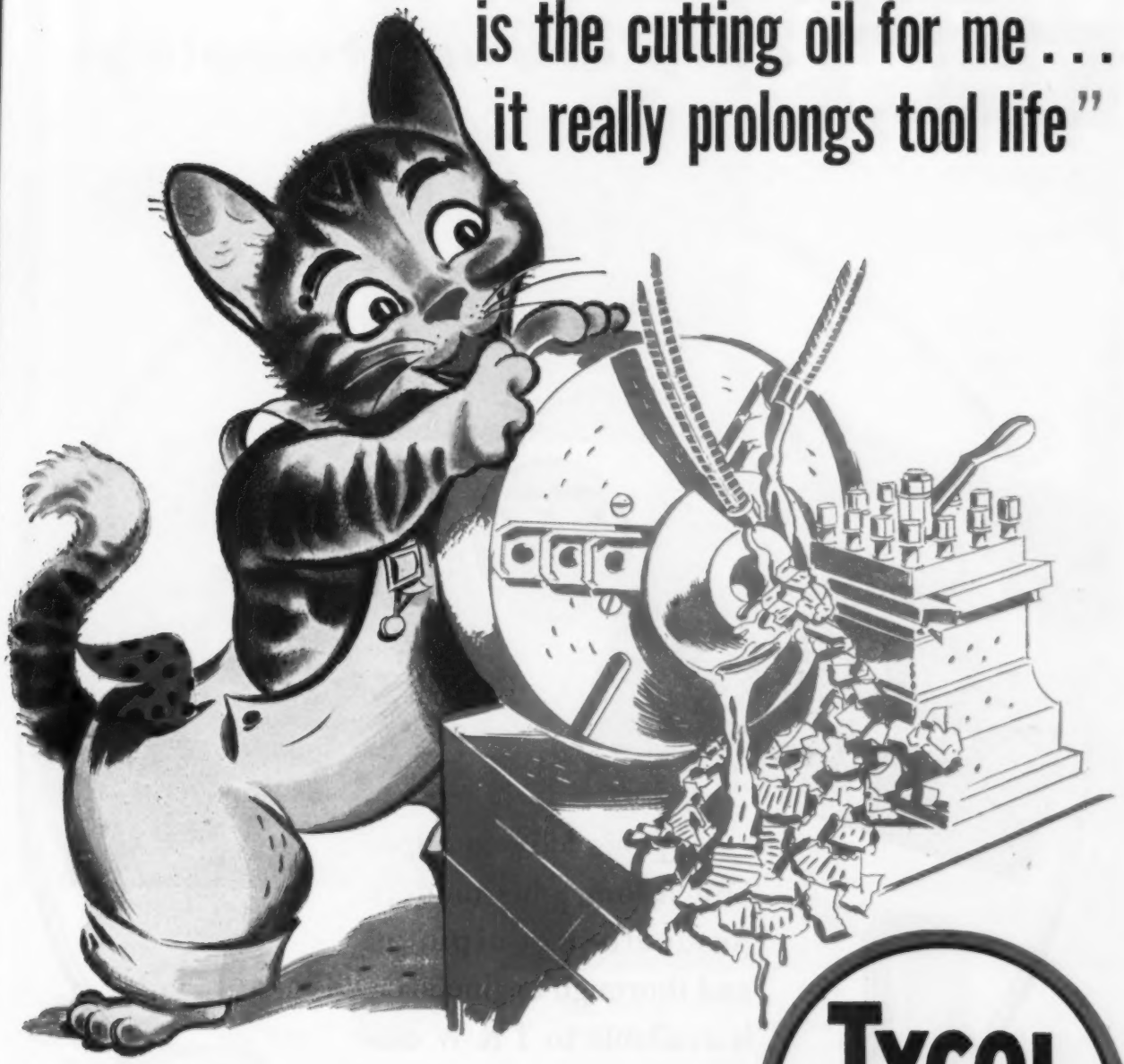
To help you convert to chrome stainless, we shall be glad to send an authoritative bulletin on the mechanical properties, corrosion resistance, weldability, etc., of these steels as compared with 18-8 stainless. Write for your copy. And remember that the advice of Ryerson stainless specialists is always yours for the asking. We suggest you discuss your chrome stainless problems with us.

National Warehouse Distributor of Allegheny Stainless in All Types, Shapes and Sizes

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

"Tycol Amulkut is the cutting oil for me . . . it really prolongs tool life"



That's 100% correct! Tycol Amulkut Cutting Oil speeds up production by permitting freer, faster cutting . . . assures uniformly finer finishes. It also cuts cost by reducing spoilage, and prolonging tool life . . . regrindings are few and far between.

Tycol Amulkut is readily emulsified, and is specially designed for use in this form . . . it is available in grades for normal and heavy-duty cutting.

For more information, call your nearest Tide Water Associated office.

TYCOL

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TIDE WATER ASSOCIATED OIL COMPANY

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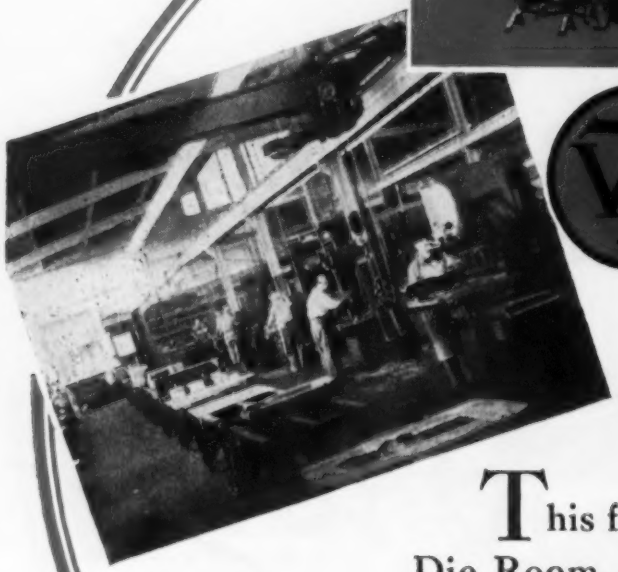
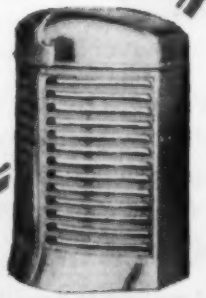
Complete service on T and W deep drawn stampings



This fully equipped Die Room, plus modern production equipment and thorough engineering, is available to T & W customers.

For those manufacturers having their own press equipment Transue will gladly quote on die requirements.



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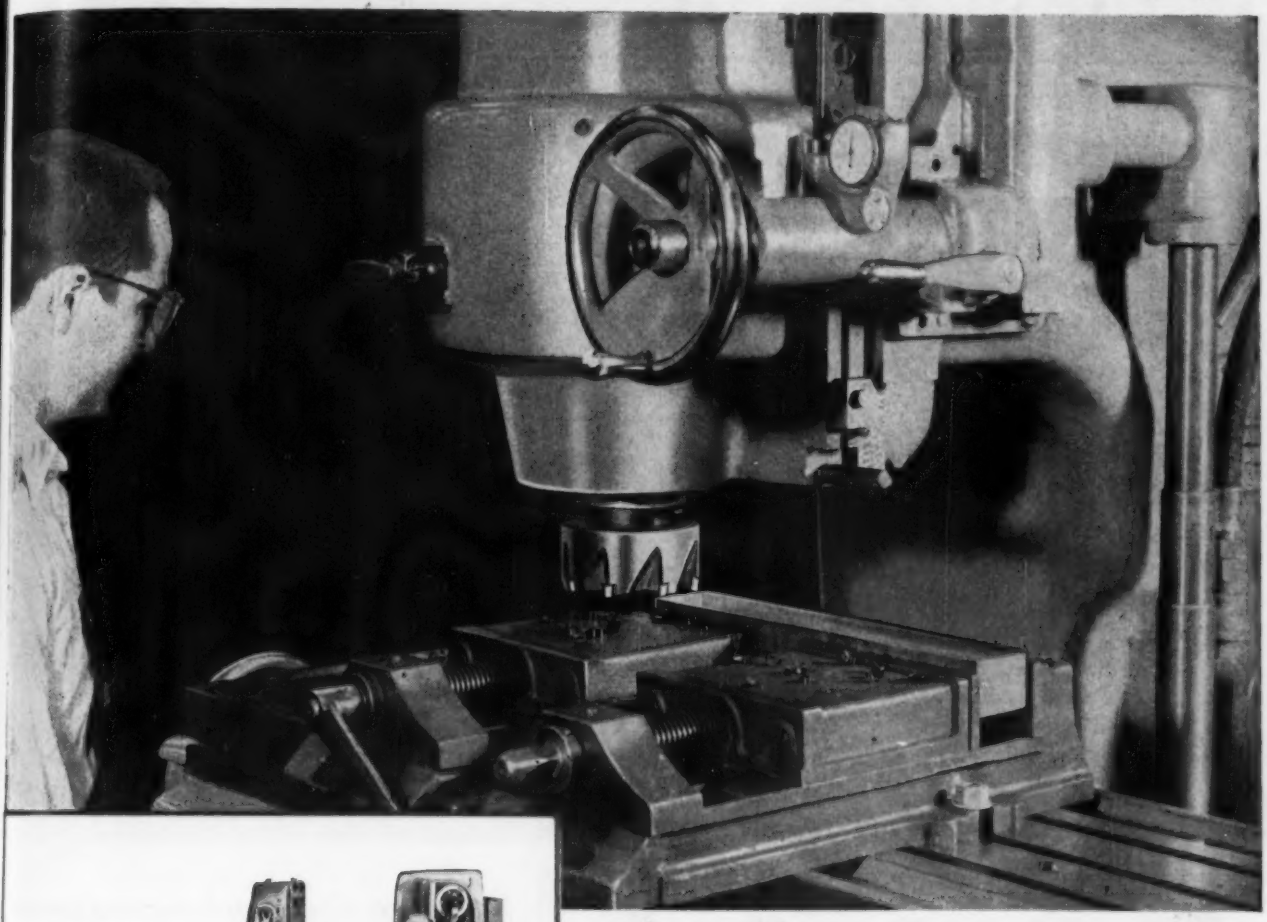
FACTS TELL THE STORY...

NEW CK MILLING MACHINE CUTS PRODUCTION TIME 75%

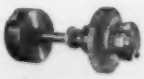


C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

New CK column easily absorbed vibration from heavy cutting load.

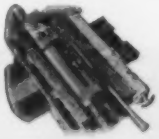
Greater horsepower permitted maximum results from modern cutter.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅜" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.



CK's 3-bearing spindle and flywheel assured fast metal removal, excellent finish.

CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.



CK's positive, metered lubrication assures trouble-free operation.

The FACTS on this job are:

Operation: Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia., 8 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm **Depth of Cut:** ¼"
Table Feed: 25 ipm **Machining Time:** 3.8 minutes
Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

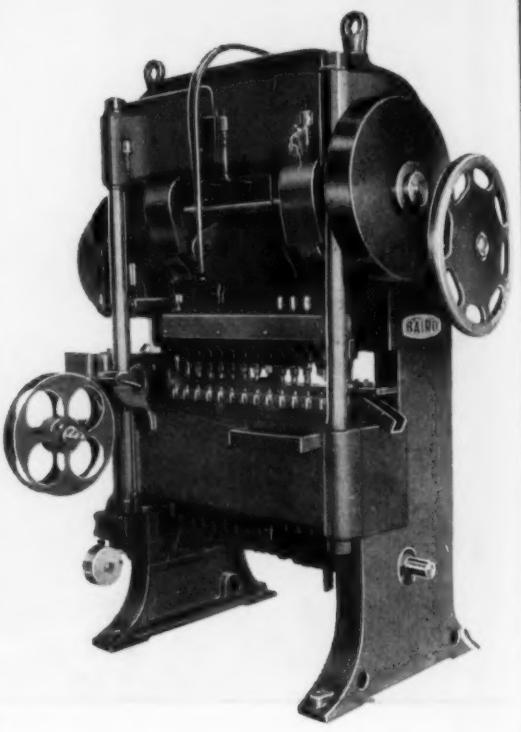
It will pay you to see the new CK line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

ASK **BAIRD** ABOUT IT!

HIGH PRODUCTION TOOLING

Is low-cost volume production of SMALL PARTS one of your problems?



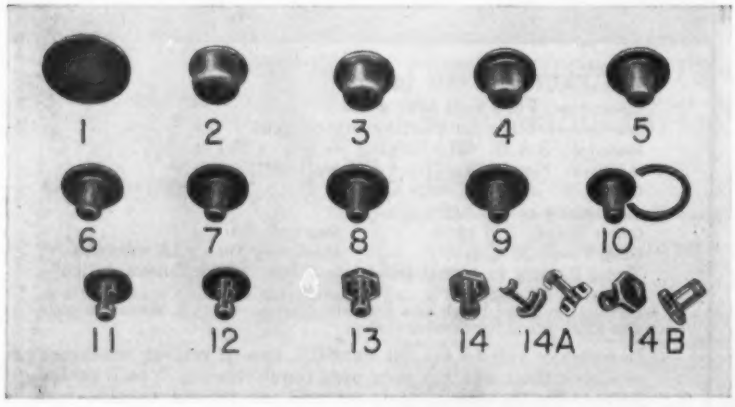
Then let us tool the job for you on a

BAIRD MULTIPLE TRANSFER PRESS...

and you can just about push the "start" button and forget it. Coiled stock is automatically fed to the press, moving quickly from station to station for blanking, drawing, piercing, embossing, slitting, trimming, broaching, sizing, hexing, forming, etc.

Here, for example, is a typical job (photograph shows work as performed in a 14-station die set).

HEX LOCK NUT COMPLETED IN ONE OPERATION



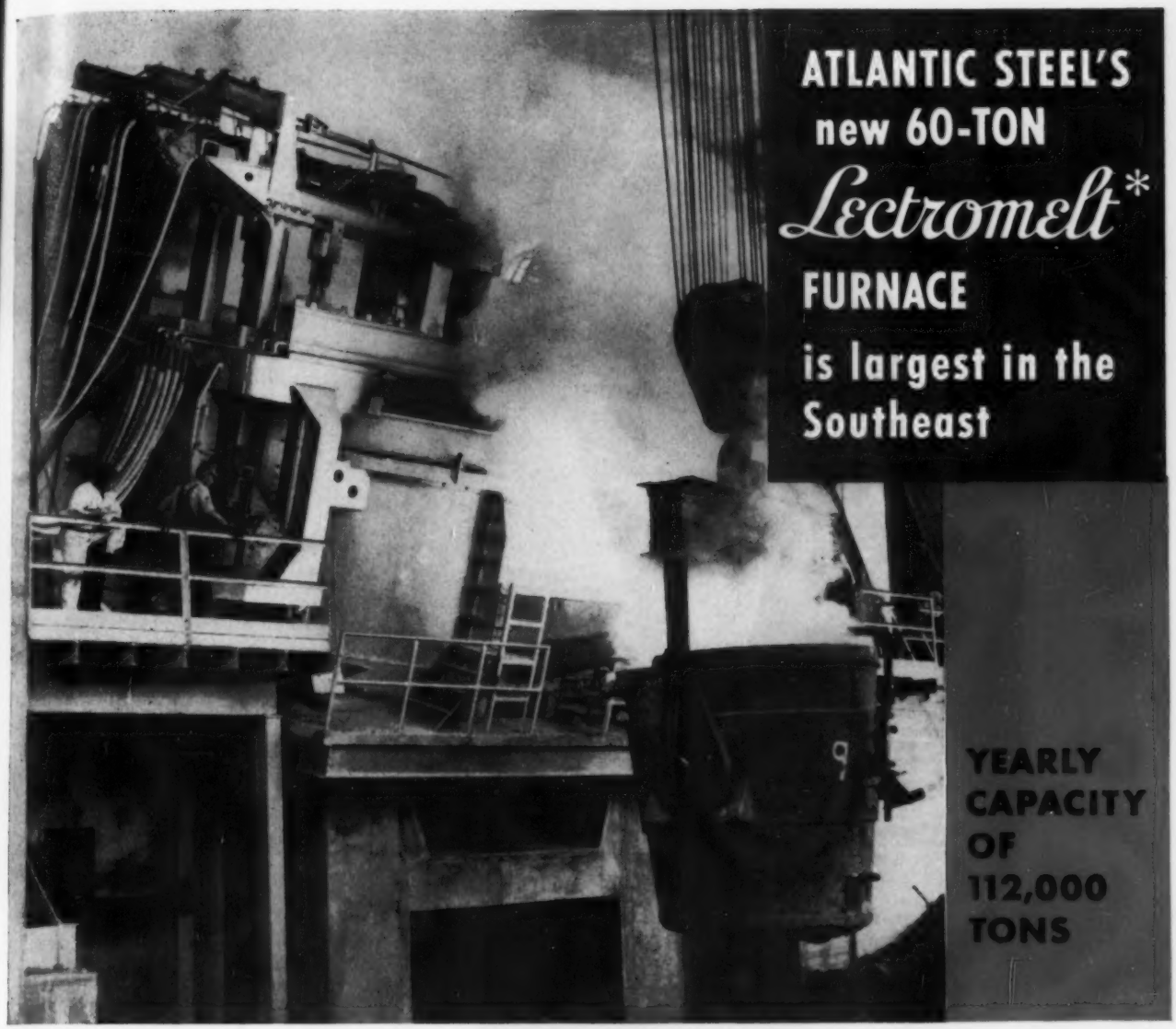
It starts with the round blank No. 1 and continue. through the drawing operation to station No. 9. At station No. 10 the flange is trimmed to size for Hexing. Station No. 11 — the two sides are pierced. No. 12 is sizing. No. 13 — the Hexing is done. No. 14 — the end hole is pierced and the piece is completed. Figure "A" is a piece cut in two to show the section. "B" are completed pieces. The production is 70 pieces per minute.

For low-cost, automatic production, "Ask Baird about it." Send for Transfer Press Bulletin.

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

1BA52



W. E. Moore, inventor of the Moore Rapid Lectromelt* Furnace, was among the celebrities who witnessed the first official pouring of metal here at Atlantic Steel Company, Atlanta, Georgia. The furnace is this company's first electric furnace, and the largest of its kind in the Southeast.

The "JT" Lectromelt Furnace has an 18-foot shell diameter, is rated at 60 tons, but is capable of producing 75 tons of steel ingots per-heat. It has timesaving and laborsaving top-charging.

If you're interested in furnaces for melting, refining, smelting or reduction, write for Catalog No. 8, Pittsburgh Lectromelt Furnace Corporation, 312 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in...CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2... ENGLAND: Birlec, Ltd., Birmingham... AUSTRALIA: Birlec, Ltd., Sydney... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege... SPAIN: General Electrica Espanola, Bilbao... ITALY: Forni Stein, Genoa.

*REG. T. M. U. S. PAT. OFF.

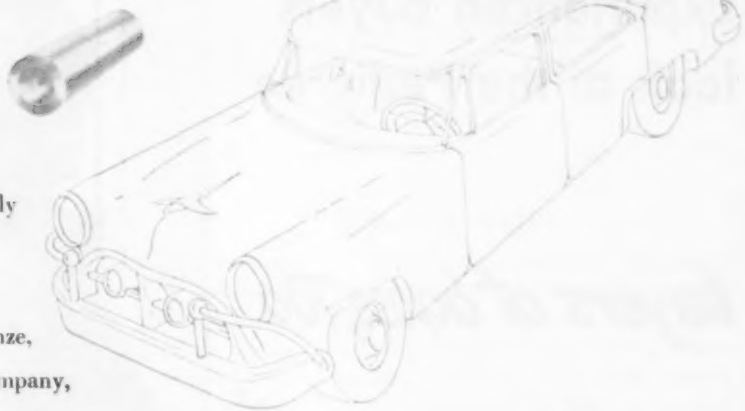
MOORE RAPID

WHEN YOU MELT... *Lectromelt*

"line one - for you"
If you're an Inland customer, that's probably your service man calling to report the status of your steel order.
As a customer at Inland, you have your own service specialist—who expedites your orders and keeps you posted on production progress.
INLAND STEEL COMPANY
38 South Dearborn Street, Chicago 3, Illinois
INLAND

Customer Reports:

Fewer Rejects and Better Bushings with Asarcon 773 Bearing Bronze!



An automobile manufacturer virtually eliminated bushing rejects by using Asarcon 773 Continuous-Cast Bronze instead of foundry castings. The Asarcon bronze, supplied by Meier Brass & Copper Company, Detroit (distributor), is, according to the user, "more uniform than the sand-cast product." It is also "available in lengths of 105", with other dimensions held to extremely close tolerances."

There is less waste because there is none of the short-end scrap associated with standard 13" stock. The bronze is cut only in the length needed. Better bushings result because Continuous-Cast Bronze is entirely free from porosity, hard and soft spots, dirt, dross or imperfections of any kind. Machining is easy; cutting tools are less subject to wear.

Asarcon 773 (SAE 660) bearing bronze is stocked in 105" lengths by distributors all over the country. This warehouse stock will be cut *long or short* to suit you. There are 216 sizes, tubular or solid round, in diameters from ½" to 5".

ASARCO CONTINUOUS-CAST RODS · TUBES · SHAPES ®

West Coast Sales Agent:
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American Smelting and Refining Company
OFFICES: Perth Amboy Plant, Barber, New Jersey
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American Smelting and Refining Company
Perth Amboy Plant, Barber, New Jersey

Please send me a free copy of the 12-page catalog "Asarco Continuous-Cast Bronze."

Name _____ Title _____

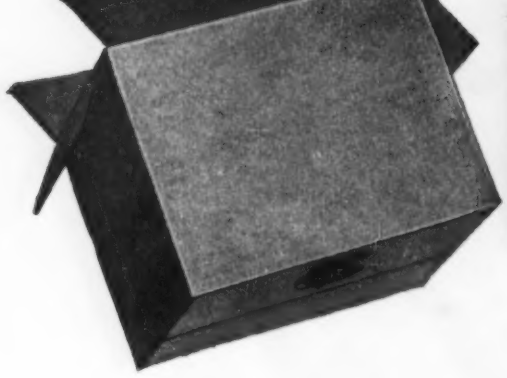
Company _____

Address _____

City _____ Zone _____ State _____

Experienced buyers look at the Pedigree

buyers of boxes, too



THE COCKER SPANIEL, American member of a family that traces back to the 14th century, is still a great favorite with sportsmen. Cockers are said to be so named because they were first used in hunting woodcocks. Affectionate and merry, they are perfect family pets.

FOR ASSURANCE OF *Quality*
FOR ASSURANCE OF *Service*
FOR ASSURANCE OF *Fair Price*

MOST corrugated containers *look* alike. But the difference shows up in performance.

The famous Union shield trade-mark is your assurance that every step in making the box, from the forest to the finishing room, is handled by trained personnel in the largest Kraft pulp-to-container plant in the world.

It symbolizes seventy-five years of leadership in designing, engineering and producing paper packages . . . plus long experience as one of the nation's larger producers of Kraft container board.

You can rely on Union shield-marked boxes to give you quality and service at a fair price—not only this year but for years to come!

UNION *Corrugated Containers*

UNION BAG & *Paper Corporation*

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: **SAVANNAH, GA. • CHICAGO, ILL. • TRENTON, N. J. • JAMESTOWN, N. C. (Highland Container Co., Inc.)**

FREE publications

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Grinding machines

Frauenthal 1800, 2000 and 2200 series double-head heavy-duty precision grinding machines are described in a new booklet. Designed for handling large internal, external and surface grinding, the units may also be used for light boring and turning. Not conventional metal cutting machine tools adapted for grinding by auxiliary attachments, the Frauenthal units were developed primarily for grinding. *A. Harold Frauenthal, Inc.*

For free copy circle No. 1 on postcard.

Taps

An all-encompassing tap catalog has just been published by the Besly-Welles Corp. The 112-p book contains information and specifications of a wide variety of taps for many different uses. There is also a handy reference section which gives information on selection of taps, classification of fits, tap drill sizes, cutting speeds and lubricants, and screw thread terms and definitions. *Besly-Welles Corp.*

For free copy circle No. 2 on postcard.

Controllers

Foxboro Model 40 Controllers are available in eight types, each of which can be specifically engineered to a particular application, whether it be controlling temperature, pressure, flow, pH, conductivity or some other process variable. Contained in a new bulletin is information on five types of control action and a detailed account of the methods used in selecting proper control action by analyzing the needs of particular processes. *Foxboro Co.*

For free copy circle No. 3 on postcard.

Shell molding

A detailed account of the new shell molding process is available in an informative 28-p booklet. Covered in the publication are a historical background of the process, a synopsis of the method, equipment requirements, material requirements, specific operations involved in shell molding and a brief account of its limitations. *Monsanto Chemical Co.*

For free copy circle No. 4 on postcard.

Electric units

The motor, generator, transformer or almost anything else you've been looking for may be in Electric Equipment Co.'s "Magic Warehouse." Dealers in a wide variety of new and rebuilt machinery, the company has released a new folder containing photographs and details of some of its large stock of equipment. *Electric Equipment Co.*

For free copy circle No. 5 on postcard.

Turn Page

use postcard below

Postcard valid for 8 weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/26/52**

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Conveyor belts

Handling of hot, heavy or highly abrasive metals is facilitated by the use of the May-Fran Hinged-Steel Conveyor Belt described in a new bulletin. Sturdily constructed to withstand extreme wear, the steel belt can be assembled in almost any width or length from stocked components to meet requirements of specific applications. *May-Fran Engineering, Inc.*

For free copy circle No. 6 on postcard.

Forging presses

E. W. Bliss Co.'s line of high speed forging presses are described in a new leaflet. Available in sizes ranging from 300 to 4000 tons, the presses feature a heavy duty air friction clutch and an air release spring set brake, both mounted on a heavy full-eccentric main shaft. *E. W. Bliss Co.*

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Insulation

A new folder covering a complete line of insulation and refractory products is available from the Illinois Clay Products Co. The vermiculite insulation described in the bulletin is available in block, brick, coating, granules and concrete. New types of chemically bonded refractory brick and a complete listing of the company's refractories are also included. *Illinois Clay Products Co.*

For free copy circle No. 8 on postcard.

Arc-welding

Information on General Electric's arc-welding accessories is available in a new bulletin. Uses, operation and specifications of more than a dozen holders, ground clamps and connectors are described. *General Electric Co.*

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Crane trailer

Something new has been added to the Silent Hoist & Crane Co.'s self-propelled Swing-Boom Crane. The mobile crane has been integrally linked with a trailer, creating a dual purpose unit: a crane for lifting, stacking, spotting and loading, and a transporter for carrying large quantities of materials in yards or shops. Another innovation is the installation of dual seats and dual operator controls which permit the unit to be operated in congested areas without being turned around. *Silent Hoist & Crane Co., Inc.*

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Mechanical tubing

Time and cost savings achieved by the use of tubing in production of hollow precision parts is discussed in a new folder. In addition to pointing out the advantages of using seamless cold-drawn carbon steel mechanical tubing, the bulletin presents tables of tolerances and mechanical properties of different grade tubing. *Babcock & Wilcox Co.*

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Industry aids

Klaas Machine & Mfg. Co. has materials handling equipment and machinery which will prove an effective aid for almost any industry. Specialists in unusual production and handling units, the company shows in a new folder some of the equipment it has designed and manufactured to meet specific customer needs. *Klaas Machine & Mfg. Co.*

For free copy circle No. 12 on postcard.

Control devices

General Electric Co.'s extensive line of electric and electronic controls is covered in a new 8-p. booklet. In addition to brief descriptions of the various control apparatus, the booklet contains quick-reference selection data and listings of additional publications which provide more complete information. *General Electric Co.*

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Turn Page

use postcard below

Postcard valid for 8 weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

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Circle numbers for Free Publications or information on New Equipment:

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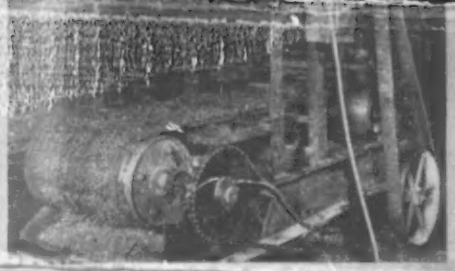

Dings non electric pulley-type scrap separator in operation at a die cast plant.

Dings Extra Powerful Self-Cleaning Rectangular takes iron out of shakeout sand.

1 2 3 4

Dings Coal Operating Lifting Magnet.

Dings "Hold Tite" magnetically holds castings in position for swing grinding.

4 MEANS TO GREATER EFFICIENCY

THE four Dings Magnets illustrated save time, labor, metals and money by doing their specific jobs more efficiently than any other method. Compare the advantages they offer over your present methods:

1 **FOR CRITICAL SCRAP SEPARATION** — Example: *A Non Electric, Permanently Magnetic Pulley Type Separator.* The magnetic PERMA-PULLEY, installed as head drive pulley in a completely self contained belt conveyor unit, takes iron out automatically, without attention, without electricity, without maintenance. Portable models available. Other types to meet any scrap separation requirement.

2 **A SAND HANDLING COST CUTTER** — *the Suspended Self Cleaning Rectangular.* Great power enables magnet to handle the particularly difficult iron extraction jobs. Self cleaning feature makes operation automatic, eliminates "carry-over" of sand with iron.

3 **THE IDEAL SCRAP LIFTING MAGNET** — Lifts more because it's cooler operating. Light weight, moisture-proof, rugged, 4-point chain suspension.

4 **"HOLD TITE" MAGNET CUTS GRINDING LABOR COSTS UP TO 25%** — Firmly holds all shapes of castings up to 1000 lbs. in position for swing grinding. Can be tilted to 7 different positions. Simple to install.

For details on any of the above magnets, use the coupon below.

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☐ Scrap Separators ☐ Lifting Magnet
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Dings

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4709 West Electric Avenue, Milwaukee 46, Wisconsin

IS YOUR SURFACE RESISTANCE LOW ENOUGH?

Are your spot welding costs low enough?

This 18-page illustrated booklet tells how to get better surface preparation of aluminum before spot welding.

¶ Have you tried the latest Oakite recommendations for cleaning and deoxidizing Alclad 24S? 52S? 2S? 61ST-4? XB 75ST? 301? *See pages 3 to 8.*

¶ How long should these alloys remain in the deoxidizing solution? *See Immersion Charts on pages 9 and 10.*

¶ What effects do different immersion times have on resistance? *See Resistance Curves on page 11.*

¶ What's the best rinse temperature after cleaning? after deoxidizing? *See page 12.*

¶ Do you have efficient controls for the concentration and temperature of your cleaning and deoxidizing solutions? *See page 14.*

¶ What advantages should you insist on when selecting materials for preparing aluminum for spot welding? *See page 17.*

FREE For your copy of *"5 things to know about preparing aluminum for spot welding"* write to Oakite Products, Inc., 30H Rector St., New York 6, N. Y.

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Induction motors

Construction features of Allis-Chalmers drip-proof and splash-proof squirrel-cage induction motors are outlined in a new company folder. Drip proof motors are available in all ratings in NEMA Design B, which is suitable for the majority of cage motor applications. Many ratings are available in Design C, for applications requiring high locked-rotor torque and normal breakdown torque. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 14 on postcard, p. 119.

Zinc

The desirable qualities of zinc for spinning and drawing are outlined in two pamphlets published by the American Zinc Institute. Economical to use, zinc helps cut production costs. *American Zinc Institute.*

For free copy circle No. 15 on postcard, p. 119.

Tractors

Big truck advantages at small truck cost is the outstanding feature of the model MT Yale Worksaver heavy-duty electric tractor covered in a new mailing piece. Complete specifications are given. *Yale & Towne Mfg. Co.*

For free copy circle No. 16 on postcard, p. 119.

Coolant filtration

Self-cleaning web-type filters for individual machines or small central coolant systems are described in a new 4-p. bulletin. The filters are available for both above-floor installation and for applications requiring bottom discharge below floor level. Either mineral or soluble oil coolants may be used. Capacity range is from 50 to 400 gpm. *Honan-Crane Corp.*

For free copy circle No. 17 on postcard, p. 119.

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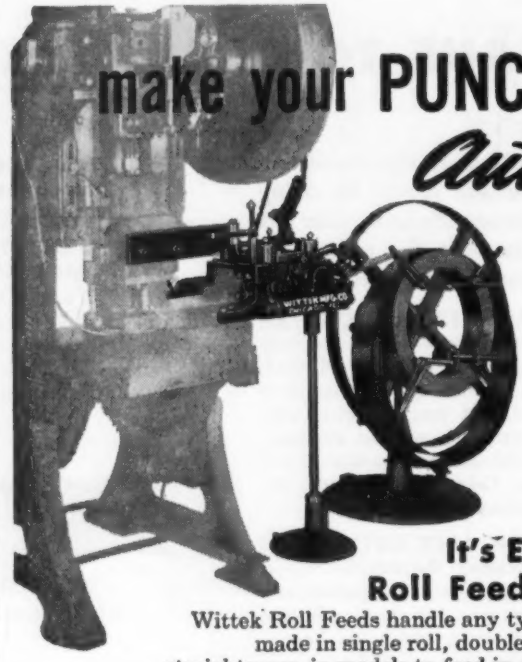

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Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

Wittek Reel Stands facilitate handling coiled stock.

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Automatic ROLL FEEDS AND REEL STANDS

Accelerating heat input, lowering melt time, has become standard practice since the Mid-Continent Steel Casting Corp., Shreveport, La., has adopted the Airco-pioneered Decarb Process for steel production.

How TO INCREASE STEEL PRODUCTION

use less power–save more time

WITH AIRCO'S STEEL DECARBURIZATION PROCESS

Oxygen injected under the slag cover at 80 psi has become the answer to Mid-Continent's faster steel production.

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Oxygen decarburization for faster heats may be put to work for you. The facilities of our Technical Sales Division may furnish you with the answers you need to know about this process for your use. If you are interested in obtaining further information, please address:

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Chief Sandusky centrifugal castings are made by a process that eliminates many of the flaws found in conventional castings. Since it is a specialized process, centrifugal casting requires special facilities, special skill, and long experience. Chief Sandusky leads in all of these essentials.

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Every casting is custom produced whether it be 3″ or 54″ in diameter, or up to 327″ in length. Quality is controlled by modern laboratory testing procedure, careful production controls, and use of only highest grade non-ferrous alloys. Sandusky experience goes back to 1907 when it pioneered commercial use of centrifugal casting. Centrifugal casting, plus Chief Sandusky's skill and experience in the development and perfection of the process assures you a product that will be right for the job.
Your inquiry will promptly bring literature, or information relative to your specific needs.

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LOWER MAINTENANCE

another reason why OHIO is the *PREMIER* mill magnet

In handling scrap, pigs, ingots—or in any mill application where magnets are subjected to severe blows—you need the extra structural strength of Ohio Magnets.

For example, take this rugged Ohio Protecto-Weld Magnet. The outer ring is a single hefty casting welded to the top plate. This means the weld is on *top* where it can't get dented in. Add to this Ohio's heavy-duty copper strip coils wound in long-lasting insulation and sealed with non-cracking asphaltum.

No wonder Ohio Magnets require less maintenance. So for extra magnet life, extra magnet value—specify Ohio Magnets. And remember, *Ohio Magnets lift as much or more than other magnets of the same size.* A-5718

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CHESTER BLAND
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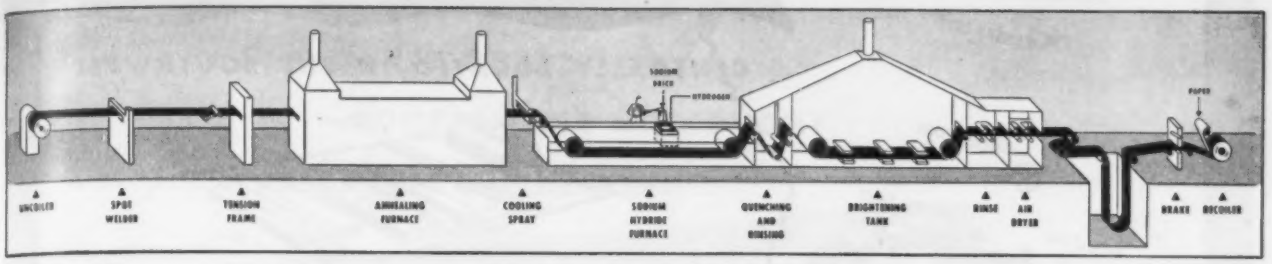
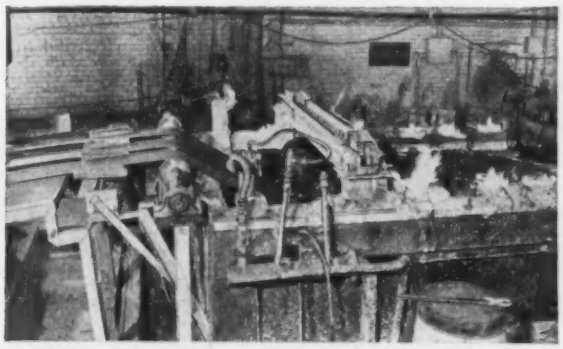
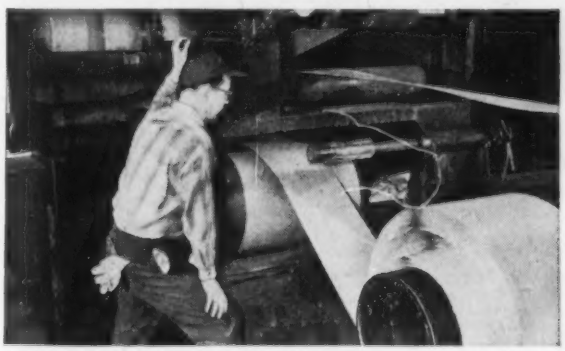
Remove Scale CONTINUOUSLY with the Du Pont Sodium Hydride Descaling Process



Successful operation in leading mills proves the adaptability of hydride descaling to continuous systems. Used in tandem with annealing, the sodium hydride process thoroughly descales stainless steel strip—in gauges of 0.010" to 0.125" and above. Particularly outstanding results are obtained with types 400 stainless steel, including the buffing grades. One fast "trip" through the hydride bath removes all scale . . . leaves the surface clean and bright, uniformly free from pits, etching and intergranular attack. So fast and thorough is hydride descaling, that the system is practicable for all common annealing speeds.



STAINLESS STEEL STRIP enters the hydride bath from the annealing furnace. Continuous hydride descaling equipment increases production and saves floor space . . . is easy and economical to operate.



BRIGHT, CLEAN STRIP—uniformly free of scale, smut and intergranular attack—leaves the hydride bath. The strip is perfectly prepared for finishing by buffing, for further processing or fabrication.

OUTSTANDING ADVANTAGES OF THE SODIUM HYDRIDE PROCESS

- **HIGH-SPEED OPERATION**—Descales in shortest practicable time cycle . . . can be adapted to manual, conveyorized or continuous operation.
- **ECONOMICAL TO OPERATE**—Permits savings in acid and metal . . . handles large volume of work in small space . . . is non-electrolytic.
- **HANDLES DIFFERENT METALS**—Alloy steel, stainless steel, nickel, copper, titanium and cobalt bearing alloys can be efficiently descaled—even in the same bath.
- **UNIFORM DESCALING**—All surfaces are uniformly descaled without need for special racking procedures.
- **USES LOW-COST EQUIPMENT**—(Carbon Steel Tanks). NO HYDROGEN EMBRITTLEMENT.
- **NO LOSS OF BASE METAL**—Bath action is reducing. Reaction stops when oxygen is removed from scale, eliminating pickling losses, etching and pitting.

FOR MORE INFORMATION about the Du Pont Sodium Hydride Descaling Process, get in touch with our nearest district or sales office or send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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Please send me more information on the Du Pont Hydride Descaling Process: advantages, applications, equipment used. I am interested in cleaning_____products.

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Sodium hydride process for positive descaling

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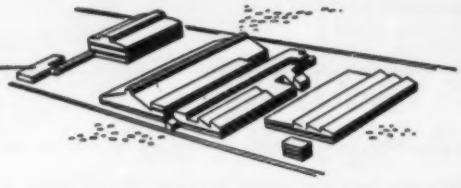

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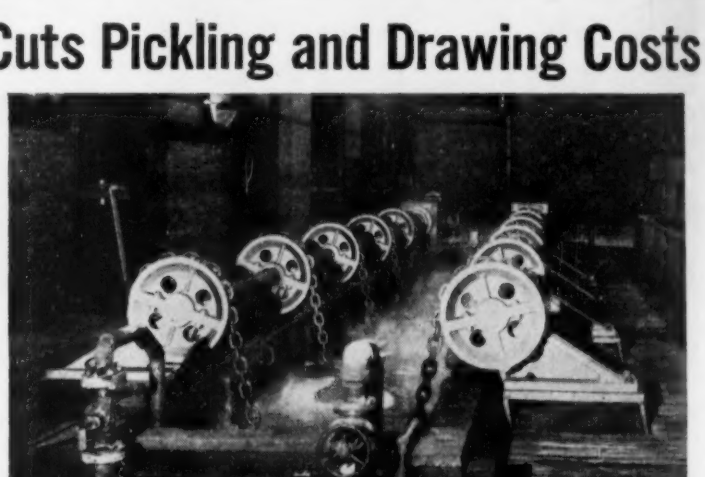
WELDCO Mechanical Pickler

Cuts Pickling and Drawing Costs



In Major Ohio Steel Plant

"First things come first," states an old saying, and that's why this Weldco Mechanical Pickler is an important addition in the Cold Drawn Division of an Eastern Ohio steel mill. For the success of the cold-drawing operation depends on the proper pickling of the bars, and this pickling-descaling job comes "first."

The Pickler shown here is a 7½-ton Mechanical Bar Pickler in a floor-level tank 5' x 5' x 43'. This equipment pickles 120 tons per turn—rounds, squares, hexagons, and flats. The spreaders, chains, and foundation bolts are made of long-lasting, corrosion-resisting Monel.

Production records in this Ohio steel plant show a uniform, complete descaling operation, reduced pickling and drawing costs, longer die life, and fewer rejects at the drawbench . . . all of which indicate a sound investment in pickling equipment that will soon pay for itself.

Weldco Mechanical Picklers are also available for pickling coils, tubing, and sheets . . . can be built to any capacity. Write today for complete information and descriptive literature.

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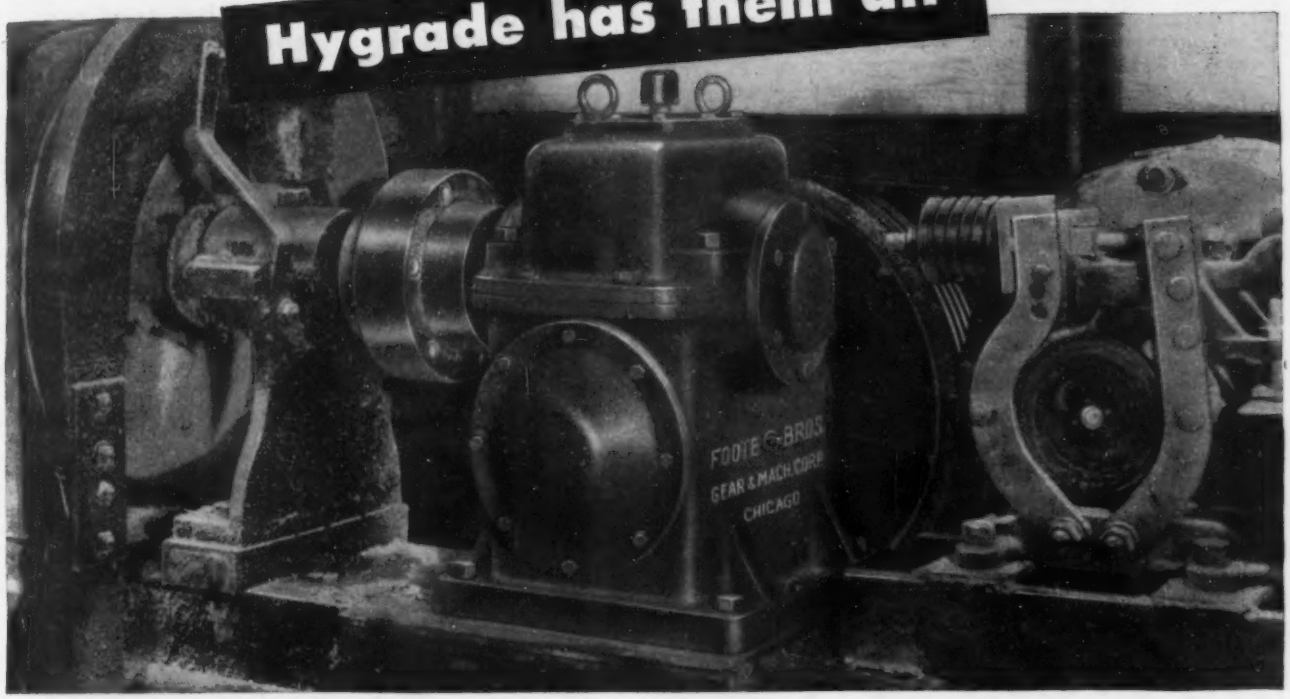

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Foote Bros. Hygrade Drives are available in horizontal and vertical designs in a wide range of ratios up to 4108 to 1 — higher when required.

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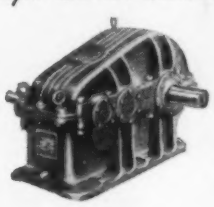

Maxi-Power Drives

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Installed on the manlift in International Milling Co. Plant at Detroit, Michigan.

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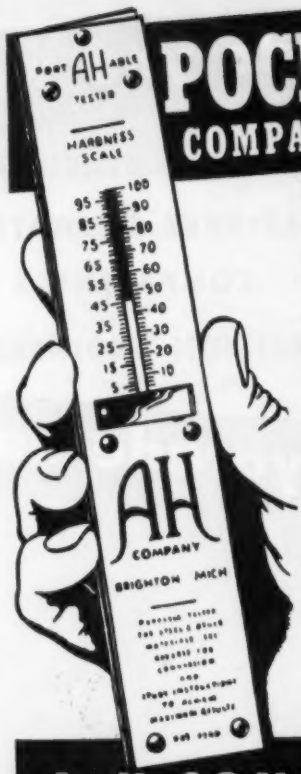

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A compact, low cost precision tester which will fill a dozen needs in your plant.

Easily carried anywhere and used on-the-job by anyone.

Gives accurate surface elasticity readings, easily converted to Rockwell or Brinnell.

Hundreds in daily use in all types of industry. A trial tester will prove its value.

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Graduate Engineer with two to four years' experience in resistance and fusion welding to assist in aircraft design applications, processing problems and development work. Should be acquainted with types of welding equipment used on ferrous and non-ferrous metals and able to correlate design and metallurgical requirements with processing methods.

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TO YOUR SPECIFICATIONS

GRIFFIN

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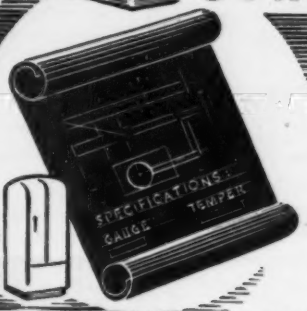

½" to 19" Wide
.002 to .500 Thick

Desired quality for forming and drawing.

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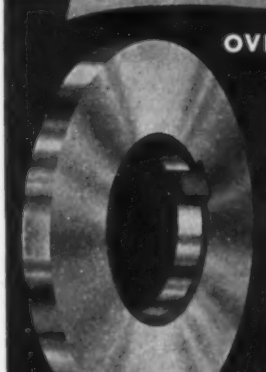

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A hardness tester particularly adapted for use on CASTINGS and FORGINGS

Puts an actual load of 3000kg on a 10mm ball.
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Can be used in any position—even upside down.

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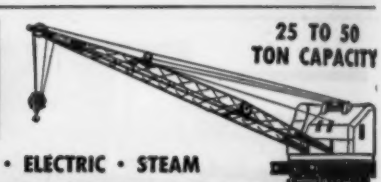

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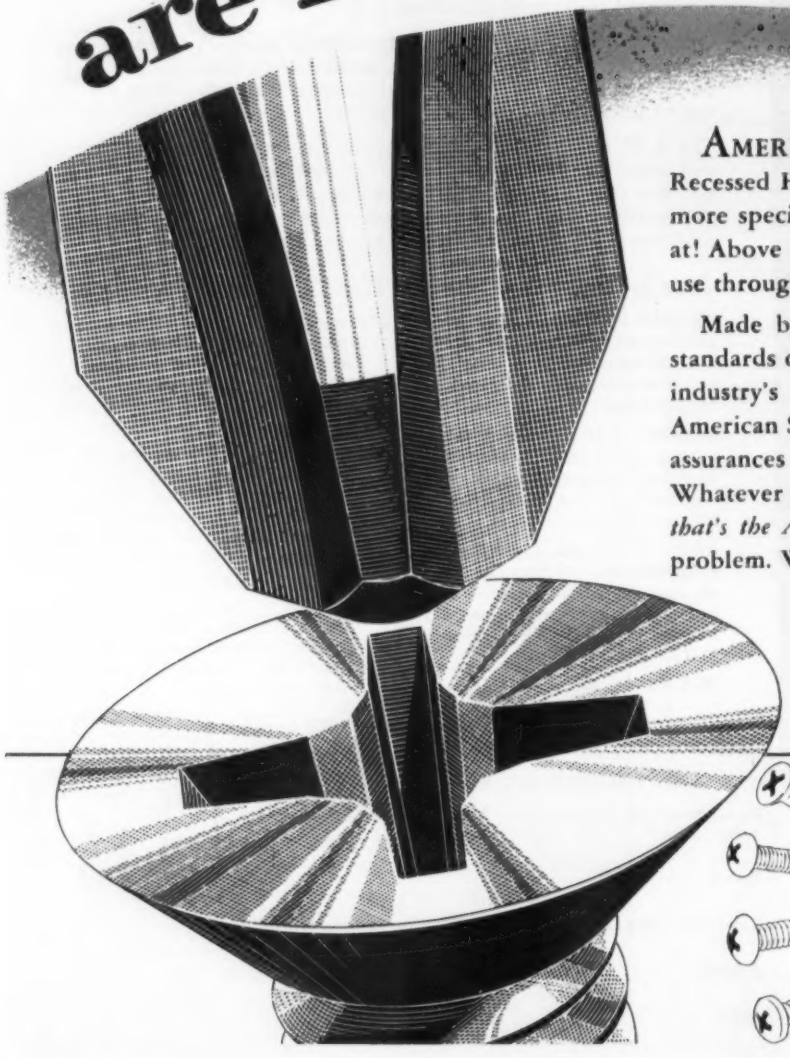

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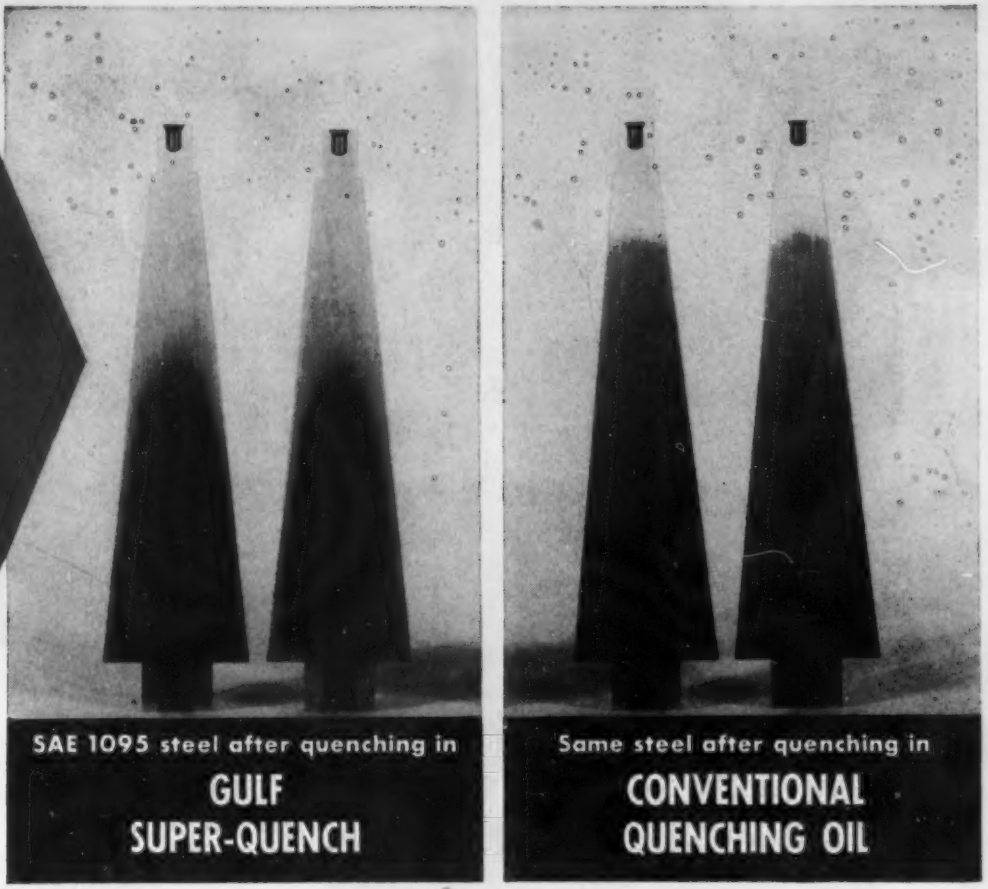

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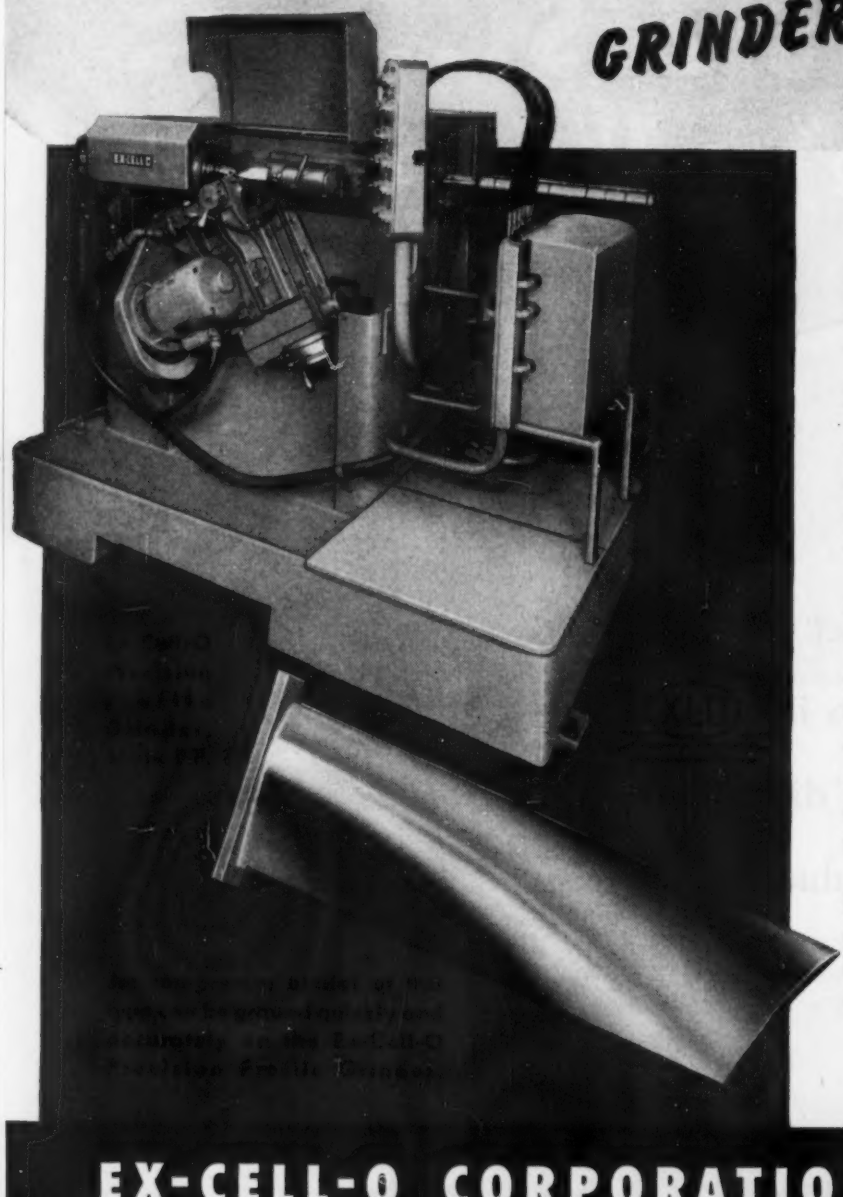
Ex-Cell-O

PRODUCTION-PROVED GRINDER FOR JET BLADES



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Performance proved in actual shop production the Ex-Cell-O Precision Profile Grinder, Style 87, now is available to shops finishing turbojet engine blades. This machine grinds the complete airfoil form, including leading and trailing edges, in an automatic cycle. Accuracy is assured by use of a master cam made from the engineers' 20-1 layouts.

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AIR COMPRESSOR—PORTABLE
315 cu. ft. Ingersoll Rand, Diesel Driven, Mounted on Pneumatic Tires, with Type UD18 International diesel Motor

BALER
Model 23-P-80 Logemann Baler, Box 32"x18"x24", Bale Size approx. 12"x11"x18"

BENDERS—PIPE
U. S. Pipe Bending Machine (Champion), Motor Drive Capacity 2" to 4"
U. S. pipe Bending Machine (Trojan), Motor Drive Capacity 3" to 8"
100 ton Baldwin Southwark Hydraulic Pipe Bender Dies for bending pipe 2½" to 8" incl.

BENDING ROLLS
6' x 5/16" Ryerson Pyramid Type Bending Roll
10' x 5/8" Bertsch Initial Type Bending Roll
16" x 1¼" Hilles & Jones Pyramid Type Bending Roll
20' x 1" Southwark Pyramid Type Bending Roll
30' x 1" Southwark Pyramid Type, Motor Driven

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Leaf Type Bending Brake Motor Driven with 5 H.P. A.C. Motor
8' x ⅝" Dreis & Krump Leaf Type Bending Brake Size No. 187, Motor Driven
12" x 3/16" Chicago #226 Steel Apron Brake, M.D.
10' x ⅝" Dries & Krump Leaf Type Bending Brake, Motor Dr. with 40 H.P. A.C. Motor

BUILDING
72'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding and to carry load of 30 ton Overhead Electric Traveling Crane

BULLDOZER
#9 Williams White Bulldozer, Motor Dr. with 50 H.P. Motor, 440 volt, 3 phase, 60 cycle. Face of Crosshead 29" x 90", Movement of Crosshead 24"

CHARGING MACHINES
6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Buda Gasoline Engine, Rubber Tires.
3½ ton Wellman-Seaver-Morgan Charging Machine Revolving—Floor Type

CRANE—LOCOMOTIVE
30 ton Model #7 Industrial Brownhoist Diesel Locomotive Crane with 55' Lattice Type Boom. Powered by Diesel Motor with Electric Starter and Gasoline Starting Engine

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Robbins Myers	28'8" Span 220/3/60
5 ton Shaw	44' Span 220/440 AC
5 ton P&H	Span 220/3/60 AC
Two—2½ ton Trolleys	
5 ton Niles	58' Span 440/3/60 AC
10 ton Shaw	67' Span 230 Volt D.C.
10 ton P&H	40' Span 440/3/60 AC
10 ton Erie	60' Span 440/3/60 AC
15 ton Niles	60' Span 230 Volt D.C.
15 ton Toledo	46' Span 220/3/60
20 ton Morgan	68' Span 230 Volt DC
With 5 ton Auxiliary	
25 ton P&H	80' Span 440/3/60 AC
With 5 ton Auxiliary Hoist	
30 ton Morgan	27'6" Span 230 Volt D.C.
40 ton Northern	40' Span 440/3/60
With 10 ton Auxiliary	
120 ton Whiting	70' Span 220/3/60
With 10 ton Auxiliary Hoist.	

DIEING MACHINES
75 ton Henry & Wright High Speed Dieing Machine Double Roll Feed. Scrap Cutter, 3" Stroke
100 ton Henry & Wright Dieing Machine, 4" Stroke, 13" Shut Height, Complete Elecl. Equip.

DIE CASTING MACHINES
Model BA-12 KUX Die Casting Machine, Air Operated, Plunger Gooseneck Type for zinc, lead & tin. Die space between bars 12¼" x 12¼", Die Separates 8" NEW 1949, never used
Pratt & Whitney Type BL-2416 Single Spindle 3-Dimensional Keller Machine, with complete electrical equipment and accessories

DRILL—MULTIPLE
Fox 57-H 6 Spindle Vertical Hydraulic Drilling Machine. Complete with Elecl. Equip.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment and numerous dies

FORGING MACHINES
5" National
1½", 2", 3", 4", 5", 6" Ajax
1", 2", 3", 5" Acme

FURNACES—ANNEALING
Westinghouse Bell Type Annealing Furnace, Hearth 30" Diameter x 32" High
200 KW Continuous Electric Bright Annealing Furnace Heating Chamber 4'6" x 30' Long. Cooling Chamber 44' Long in two parts

FURNACES—HEATING
Surface Combustion Billet Heater, Super Fast. Tangential Burner, 3-Section, Pusher. Capacity 3600# per hour gross
Tocco Jr. Induction Heating Furnace, 2-Station 9600 Cycle, Type 20, 40 H.P. Motor 220/60 20 KW Generator 220 volt
60 KW Leeds & Northrup Home Furnace #9478-UB-28. With controls. Work Space 28" dia. x 28" deep

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace. Top Charge. Complete with Transformer. New 1943—Little Used
15 ton Heroult Model V-12 Top Charge Hydraulically Operated, Complete with Transformer Equip.
25 ton Moore Size "NT" Melting Furnace With 7500 KVA Transformer 13,200/3/60

GEAR REDUCERS
500 H.P. United Combination Reduction Gear & Pinion Stand. Gear Ratio 8.581:1
600 H.P. Westinghouse Reduction Unit Ratio 3:76-1

GRINDERS—CYLINDRICAL
14 x 36" Norton Type C, Complete with Elecl. Equp.
10 x 36" Norton Model C-14481 Cylindrical Grinder. Complete with Elecl. Equip.

GRINDER—UNIVERSAL
#2 B&S Universal Grinder, Complete with regular equipment—NEW

GRINDERS—SURFACE
#34 Abrasive Vertical Spindle Surface Grinder 8" x 24", Wet Type
14" x 60" Mattison Hydraulic Surface Grinder Working Surface of Table 14" x 5', Hydraulic Table Feed, Magnetic Chuck 15" x 60"

HAMMERS—BOARD DROP
1200, 1600, 4000 lb. Model J2 Chambersburg
1000 lb. Billings & Spencer

HAMMERS—STEAM DROP
1500, 5000 lb. Erie

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1200 lb. Massillon Single Frame
1500, 1600, 2000, 3000, 4000 lb. Chambersburg
600, 1500, 2500 lb. N.B.P.
600, 1100, 1500, 2000, 2500, 3500, 4000# Erie

HAMMERS—MISCELLANEOUS
No. 2B Nazel Hammer, Motor Driven
No. 6N Nazel Hammer, Geared Motor Drive
200 lb. Bradley Compact Hammer, Arr. for Motor Drive with 10 H.P. A.C. Motor
2000 lb. Chambersburg Pneumatic Hammer Complete with Elecl. Equip. New 1951
15" x 12" Chambersburg Cecostamp Hammer, 18" stroke
30" x 24" Chambersburg Cecostamp Hammer, 24" Stroke
48" x 36" Chambersburg Cecostamp Hammer, 42" Stroke

LEVELER—ROLLER
36" McKay Roller Leveler 17 Rolls 5¼" Dia.

LEVELER—STRETCHER
No. 721 Torrington Stretcher Leveler. Complete with pump and motors. Capacity Sheet 14' x 3' 6" wide

NAIL MAKING MACHINES
No. 1½ National—Sizes 10D, 12D, 16D, 20D, 30D
No. 3 National—Size 6D
No. 2 Glader—Sizes 6D, 7D, 8D, 9D
Angell—Sizes 10D, 12D, 16D, roofing

NIBBLERS
No. 1 Savage Gray Rotary Die Metal Cutter, M.D. Capacity 316", 34" Stroke
No. 3B Campbell Nibbler—NEW

PLANERS
32x35"x10' Niles One Rail Head
48x48"x12' Niles-Bement-Pond, Four Head
48"x48"x20' Cincinnati, Four Head
60x60"x12' Niles-Bement-Pond, Four Head
72x72"x12' Niles-Bement-Pond, Four Head

PLANERS—OPEN SIDE
48"x48"x14' Detrick & Harvey
60"x60"x18' Detrick & Harvey, Two Head, M.D.

PLANER—PLATE EDGE
30' Southwark Plate Edge Planer, Motor Driven. Equipped with 16 Pneumatic Jacks

PRESSES—HYDRAULIC
No. 200 Milwaukee Briquetting Press, Complete with Pumps. Piston Load 118 tons. Hydraulic Operating Pressure 2100 lbs. psi.
75 ton Williams White Straightening Press, 27" Stroke. Bed 8' x 16", 6½" Dia. Ram
150 ton Elmes Double Action Hydr. Press, 20" Stroke of Blankholder, 32" Stroke of Punch Slide, 36" x 27" Bed Area
200 ton Bliss Hydrodynamic, 48" Stroke, Bed Area 24" x 24", Hydr. Pump Incl.
500 ton Southwark Open Throat Hydraulic Press, 12" Stroke, Platen 56" x 56"
700 ton Elmes Forming Press, 27" Stroke 30" Dia. Ram, Platen 40" x 88" with overhang 40" x 129", Complete with Pump & Motor

PRESS—HYDRAULIC WHEEL
100 ton Elmes Inclined Hydr. Wheel Press, 72" Between Parallel Bars. Complete with Pump and Motor

PRESS—KNUCKLE JOINT
#27 Bliss Knuckle Joint Embossing & Coining Press 1000 ton Capacity, 2½" Stroke, 13" Shut Height

PRESSES—STRAIGHT SIDE
No. 305 Bliss 9" Stroke 14" Shut Height Equipped with Marquette Air Cushion
No. 59 Toledo Double Geared Tie Rod Press 255 ton Friction Clutch 18" Stroke, 36¼" x 35" Bed Area
No. 3 Ferracute Super Speed Punch Press, 30 ton Capacity, NEW 1946—never used
No. 675B Bliss Single Geared 1½" Stroke, Double Roll Feed & Chopper, 10 H.P. A.C. Motor
No. 620 Bliss High Production Press, 1½" Stroke

PRESSES—TRIMMING
Bliss S.S. Trimming Press with Side Shear, 250 Ton Capacity, 8" Stroke, 52"x30" Bed Area
No. 3 Erie Flywheel Drive Trimming Press, 3¾" Stroke, 13" Between Guides

PUNCH—BEAM
Long & Allstatter Double End Beam Punch. Capacity Beam Punch End—Punch flanges and web 24" I-beam and smaller

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Kling Deep Throat Riveter & Punch, Belted Motor Drive with 10 H.P. A.C. Motor, Capacity Rivets ⅜" Cold, ⅝" Hot, Capacity Punch ⅝" thru ⅞" Mild Steel

ROLLS—FORMING
12 Stand Yoder Roll Forming Machine, M.D. 2" Dia. Rolls and Arbors
Bliss 5-Stand Roll Forming Machine, Shaft 2⅞"

ROLL—PLATE STRAIGHTENING
7 Roll Bertsch Plate Straightening Machine, Capacity 10' x ⅝", Complete Elecl. Equip.

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8"x10" Schmits Single Stand Two High
12"x16" Single Stand Two High, Comp. with Elecl. Equip.
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12"x24" Waterbury Farrel Two High
18"x24" Waterbury Farrel Two Stand Two High
20"x36" Poole Two Stand Two High
22"x40" Single Stand Two High
28"x60" Single Stand Two High

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Mesta Swing Frame Hot Saw, 36" Blade, Motor Driven Capacity up to 10"

SHEAR—ANGLE
Long & Allstatter Double Angle Shear, Model B, Capacity 6x6x¾", Complete with Elecl. Equip.

SHEAR—BAR
No. 2 LH Lewis Open End Bar Shear, Motor Drive, Capacity 1½" Round

SHEAR—BILLET
Long & Allstatter "C" Frame Billet Shear 5" Stroke, Bed Area 20" x 41"

SHEAR—GATE
6' x ⅜" Bertsch No. 8 Gate Shear, Motor Driven, 18" Gap NEW 1952

SHEARS—GUILLOTINE
No. 2 Hilles & Jones Guillotine Shear, Capacity 2¼" Round, 2" Square, 6x1¼" Flat
No. 6 Hilles & Jones Guillotine Shear, Capacity 5" Round, 4½" Square, 16x2" Flat

SHEARS—ROTARY
No. 60 Quickwork Rotary Shear, ¾" Capacity
No. 100 Kling Rotary Shear, 1" Capacity

SHEARS—SQUARING
12'x3/16" Stamco Steel Squaring Shear, Motor Dr.
8' x ¼" Drabert Model THZ 6/2500
8' x 3/16" Cincinnati Series 1403, Motor Driven
6' x ¼" Long & Allstatter, Belted Motor Drive

SLITTERS
24" Niagara Steel Coil Slitter, Capacity 6 cuts 5/16" Equipped with Quick Change Head
31" Yoder Sheet Slitter No. 530, Capacity 3 Cuts .194" to 8 Cuts .156", Motor Dr.
72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS
No. 1½B Sutton Round Straightener, Motor Dr. Capacity Tubing 5/16" to 2⅞"—modified to handle up to 3½" O.D. tubing
¾" Shuster Straightening & Cut-Off Machine, 30' Cut-Off, Complete with 15 H.P. A.C. Motor

SWAGING MACHINES
No. E4 Langelier, Capacity 1½" Tubing
No. 408 Etna Swager, Capacity 4" Tubing

TESTING MACHINES
300,000# Southwark *Emery* Universal Hydraulic

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter, Capacity for steel or aluminum alloys ⅜" max., Trimmed width 22" min., 66" max., Scrap Length ¾" min. 2¼" max.

WELDERS
150 KVA Federal P2-12A Press Type Spot Welder 440 volt single phase 60 cycle
Taylor Winfield Press Type Spot Welder, Type HWRD-36-3 HI-WAVE
250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle, Mechanical Contactor HI-Pressure Clamp Assembly—NEW 1949

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GENERATORS—250 V. D.C.

K.W.	Make	Type	Speed
1000	G.E.	MPC	514
500	G.E.	MPC	900
300 (2)	G.E.	CY-272	1200
400	Cr. Wh.	Synch.	1200
275	Al. Ch.		870
250 (2)	Cr. Wh.	Syn.	1200
225	Cr. Wh.		690
225	G.E.		870
150	West.	SK	900
125 (2)	G.E.	MPC	1200
100	Delco		1150
75	West.		1150
75 (2)	Cr. Wh.		1200
50	West.	SK	900
40	West.	SK	1150
40	ABSco	5VG3	1150
30	G.E.	TC93-4	1800
25	G.E.	RC	1150
20	Watton	D	1150
15	Star		1750
10	G.E.	RC	1150
7½	West.	SK	1750

GENERATORS—125 V. D.C.

K.W.	Make	Type	Speed
150 (2)	West.	SK	1200
100	El. Mchy.	651-T	1200
100	G.E.	RC	1200
100 (3)	West.	SK	900
100	G.E.	MPC	900
60 (2)	West.	SK	1800
50	G.E.	RC	1150
50	Cr. Wh.	CCD	1160

GENERATORS—600 V. D.C.

K.W.	Make	Type	Speed
400 (4)	G.E.	MPC	1200
325	G.E.	MPC	1200

LOW VOLTAGE D.C.

Amp	Make	Voltage
10,000	J-L	2/10
7500 (2)	Nor.	7½
5000	HVW	6
2500	Chandey.	6/12
500	Chandey.	12
1500	Century	24
500	West.	32
1000	Century	32
1000	Chandey.	40
1500	Century	40
1500	G.E.	50
1000	G.E.	60
1000	G.E.	75

MOTORS—230 V. D.C.

H.P.	Make	Type	Speed
200/130	Cr. Wh.	CMC	900/450
187½	G.E.	MDS	435
150	Sprague	LC	1700
100	Al. Ch.		1150
100	F-M	TRC	725
100	G.E.	RC-36	775
90/45 (2)	G.E.	RF-17	950/450
75	Cr. Wh.	CMC-125H	375/950
60	West.	SK	680
60	West.	SK	250/1000
50	G.E.	CD-93	3600
50 (2)	West.	SK	565
50	G.E.	RF	250/1000

FREQUENCY CHANGERS

KVA	Make	Type	Output Frequency
231	G.E.	ATB	150 cy.
150	G.E.	ATB	150 cy.

MOTORS—Squirrel Cage

H.P.	Make	Type	Speed
250	G.E.	KT559	1750
200	Wagner	RP-2	1800
200	G.E.	KF	880
200 (2)	Al. Ch.	AR	870
150	West.	CS	1150
150	Wagner	31VRN	900
150	G.E.	IK	600
125	Al. Ch. (5)	AR	1760
100	G.E.	KT	1800
100	G.E.	IK	1750
100	West.	CS	1750
100 (2)	Al. Ch.	AB	1150
100	G.E.	K	1175
100	West.		870
75 (2)	West.	CS	1750
75	G.E.	KT	900
75	West.	CS	720

MOTORS—Slip Ring

H.P.	Make	Type	Speed
500	Elliott		1180
500 (2)	G.E.	IM	450
400	G.E.	IM	900
400	West.	CW	435
300	G.E.	IM	870
300	G.E.	IM	690
250	G.E.	IM	435
200	G.E.	MT	1750
200	G.E.	MT	1175
125	West.	CW	1750
100	G.E.	MT	1150
75	Lincoln		1750
75	G.E.	MT	900
75	West.	CW	690
60	G.E.	MT	1720
60	West.	CW	200

MOTORS—Synchronous

H.P.	Make	Speed
475	West.	720
300	G.E.	900
200 (2)	West.	900
200	Burke	900
180	G.E.	900
165	G.E.	1200
150	G.E.	900
150	G.E.	720
75	G.E.	900

Please Send Us Your Inquiries

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Established 1910
150 GRAND STREET, NEW YORK 13, N. Y.
CAnal 6-6976

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We offer the following from our warehouse stock subject to prior sale:

HOT ROLLED STRIP
1. 15 Tons—⅛" x 1" x 16-20' MILD
2. 5 Tons—⅛" x 1" x 6' C-1045
3. 6 Tons—⅛" x 1¾" x 16' MILD
4. 3 Tons—⅛" x 2" x 16' MILD
5. 6 Tons—3/16" x ¾" x 16' MILD
6. 10 Tons—3/16" x 1" x 16-20' MILD
7. 11 Tons—3/16" x 1" x 16-20' 30/40 C
8. 14 Tons—3/16" x 1¼" x 16-20' MILD
9. 12 Tons—3/16" x 1½" x 16-20' MILD
10. 20 Tons—3/16" x 2½" x 18-20' MILD
11. 35 Tons—3/16" x 10" x 10-12' MILD

HOT ROLLED COMMERCIAL QUALITY SHEETS
12. 5 Tons— 9 Ga. x 28¾" x 72⅜"
13. 5 Tons—11 Ga. x 32-48" x 60-120"
14. 50 Tons—11 Ga. x 24 13/16" x 86½"
15. 25 Tons—11 Ga. x 24 13/16" x 120"
16. 20 Tons—11 Ga. x 33½" x 96-120"
17. 5 Tons—13 Ga. x 40-60" x 60-96"
18. 7 Tons—18 Ga. x 35½" x 71½"
19. 5 Tons—18 Ga. x 36" x 120"
20. 12 Tons—18 Ga. x 36¼" x 71"
21. 50 Tons—20 Ga. x 36" x 120"

COLD ROLLED COMMERCIAL QUALITY SHEETS
22. 6 Tons—18 Ga. x 44" x 63"
23. 3 Tons—18 Ga. x 44" x 98"
24. 4 Tons—18 Ga. x 38" x 120"
25. 5 Tons—19 Ga. x 58" x 71¾"
26. 7 Tons—19 Ga. x 72" x 85½"
27. 4 Tons—25 Ga. x 32⅜" x 110"

HOT ROLLED MILD STEEL PLATE
28. 40 Tons—3/16" x 29" x 110"
29. 9 Tons—3/16" x 41½" x 120"
30. 50 Tons—.197" x 48" x 120"
31. 5 Tons—¼" x 8" x 240"
32. 50 Tons—5/16" x 49½" x 144"
33. 20 Tons—5/16" x 50" x 144"
34. 25 Tons—½" x 9 11/16" x 240"
35. 16 Tons—½" x 24" x 96-144"
36. 25 Tons—½" x 30" x 180-240"
37. 5 Tons—½" x 72" x 240"
38. 3 Tons—⅝" x 72" x 198"
39. 5 Tons—¾" x 15" x 132-216"
40. 12 Tons—¾" x 24" x 144-180"

HOT ROLLED ANGLES
41. 7 Tons—¾" x ¾" x ⅛" x 16' 30/40 C
42. 11 Tons—⅞" x ⅞" x ⅛" x 16' MILD
43. 10 Tons—1" x 1" x ⅛" x 20' 30/40 C
44. 5 Tons—1¼" x 1¼" x ⅛" x 12' MILD
45. 4 Tons—1½" x 1½" x ⅛" x 12' MILD
46. 8 Tons—1½" x 1½" x ⅛" x 15'—C-1050
47. 20 Tons—2" x 2" x 3/16" x 20' 30/40 C
48. 6 Tons—2½" x 2½" x 5/16" x 20'—MILD
49. 8 Tons—3" x 3" x ½' x 20' MILD
50. 9 Tons—3½" x 3½" x ½" x 20' MILD

Please refer to item number when replying.

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Phones: CEntral 6-1936-7-8

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MILES' QUALITY

AUTOMATICS, 000 Brown & Sharpe
AUTOMATIC, ⅞" 4-spindle Gridley Model G
AUTOMATIC, 8" Bullard Mult-Au-Matic, 6-spindle serial 10770
BORING MILL, 4" Detrick & Harvey horizontal, floor type
BORING MILLS, Two No. 5D Moline, 6-spindle cylinder boring
BROACH, No. 1 Foote Burt duplex surface
BROACH, 2-ton American horizontal hydraulic
BROACH, V42 American hydraulic, 18 ton
BROACH, 12-ton VU 12 LaPointe vertical 34" stroke
BULLDOZER, No. 22 Williams & White
DRILL, No. 310 Baker heavy duty
DRILL, 24" Cincinnati upright
DRILL, 24" No. 25 Foote Burt
DRILL, 11-spindle No. 1 Baush
DRILL, 12-spindle No. 10 Defiance rail type
DRILL, 36-spindle Baush, adjustable spindle
DRILLS, 1- and 4-spindle Avey hydraulic feed
GEAR HOBBER, No. 12H G&E
GEAR HOBBER, No. 130 Cleveland Rigidhobber
GEAR HOBBER, No. 3 Adams Farwell
GEAR HOBBERS, Two No. 12 Barber-Colman
GEAR HOBBERS, Nos. 1 and 25 5A Lees Bradner
HONE, No. 2610 Barnes hydraulic, late type
GEAR SHAVER, 8"-12" Red Ring
GRINDERS, CENTERLESS, Two No. 2 Cincinnati, one with pressure lubrication
GRINDERS, CYLINDRICAL, 10x18 Norton, type A & C
GRINDERS, CYLINDRICAL, 10x18 Norton with hydraulic quick infeed
GRINDER, CYLINDRICAL, 12"x36" Bath universal
GRINDERS, INTERNAL, Nos. 16-2E and 24-3E Bryant
GRINDERS, INTERNAL, Nos. 72A3 and 72A5 Heald
GRINDERS, SURFACE, 12" and 16" No. 22 Heald
GRINDER, Groove, late No. 33 Excello, now arranged for groove grinding
HAMMER, No. 5N Nazel pneumatic
HAMMER, 40 lb. Bradley helve
LATHE, TURRET, Nos. 3 & 7 B&O conv. motorized
MILLERS, Two No. 2 Cincinnati plain
MILLERS, Nos. 1, 2 and 3 Kent Owens hand
MILLER, 18" Cincinnati automatic
MILLER, 24" Cincinnati automatic duplex
MILLER, type 45 Product-O-Matic
MILLER, 30½" x 21" x 12' Ingersoll 4-spindle planer type
MILLER, 48" x 20" x 20' Ingersoll planer type, 3 vertical heads
MILLER, 50" Ingersoll 2-spindle rotary continuous
MILLER, 84" Ingersoll 6-spindle rotary continuous
MILLERS, Six Ingersoll rise and fall
MILLER, THREAD, Type C Hall planetary
MILLER, THREAD, Nos. 4, 6 and CT 36 Lees Bradner
PLANER, 28"x28"x8' Gray double housing one head
PLANER, 36"x36"x8' Cleveland openside
PRESSES, Nos. P81, P1, P2, P3, PA4, P5 and CA4 Ferracute
PRESS, No. 61 Cleveland 8BI
PRESSES, Nos. 56½, 57½ and 77½ Bliss s.s. trimming
PRESS, No. 245½ Hamilton s.s. tiered frame
PRESS, No. EG54 Ferracute knuckle joint
PRESS, 800 ton No. 665 Toledo knuckle-joint coining
PRESS, No. DA8411 Hamilton double action toggle draw
PRESS, 100 ton HPM hydraulic
PRESS, 1000 ton Baldwin Southwark "Hy-Speed" vertical hydraulic
RIVETERS, No. 5A Grant pedestal vibrating type
REAMERS, three Houde specials
SLOTTER, 16" Bement Miles crank
SAWS, Three 8163 Kalamazoo metal cutting band, new
SAW, 7" No. 14 Higley cold-cutting
SAWS, three L-W (Toledo) power hack, new
SHAPER, 27" Morton draw cut
SHEAR, 38" throat No. 17F New Duty
TAPPER, 14-spindle No. E5 Natco
TAPPERS, Two No. 71 Ettco
TAPPERS, Two Greenlee 3-way special
TAPPER, 19" Hammond sensitive drilling & tapping
TESTER, 230,000 inch-pound Tinius-Olsen No. 2 torsion
THREADERS, 2" Landis pipe threading and cutting
THREADERS, Two ¾" Landis, double spindle
THREADERS, 2" Oster rotary head
UPSETTERS, Two 4" Ajax heavy duty, twin-gear
WELDER, 200 KVA Federal flash butt
WELDER, 100 KVA Thompson automatic spot
WELDERS, 12" and 14", 12 KVA American Electric Fusion Co. spot

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No. 25G General Flexible Power Press, m.d.
No. 37E Wilson Hydraulic, hand operated, 50 tons, new
King Screw Press, s.p.d.
No. 5 Groenerd Arbor Press, floor type, hand operated

AUTOMATICS

4 spindle 1¼" Conomatic, m.d., bar, 1942 machine
No. 6A Potter & Johnston, m.d.
No. 6C Potter & Johnston, m.d.
14" Fay Flanders Type, m.d.
4 spindle 2¼" Cleveland Model "K", m.d.
2¼" Gridley Single Spindle, m.d.
2½" Cleveland Model A, m.d.
4¼" Cleveland Model A, m.d.
6" Cleveland Model A, m.d.
7¾" Cleveland Model A, m.d.
No. 8A Cleveland, m.d., 8" cap., latest
5D Potter & Johnston, m.d.

BOLT THREADERS

¾" Style R Economy Automatic Threading Machine, belt
Victor Nut Facing Machine, m.d., cap ⅝" to 2" nuts
1" Landis Double Spindle, m.d. thru gear box
1½" Landis 2 spindle, late
1½" Landis 2 spindle, older type

HORIZONTAL BORING MILLS

#31 Lucas, m.d.
Barrett Double End, 5" and 7" spindles, m.d.
3½" bar Landis Floor Type, m.d.
4" bar Detrick & Harvey Floor Type, m.d.
4½" bar Niles Table Type, m.d.
5½" bar Niles, m.d.
10" bar Sellers, Floor Type, m.d
Pair Tables for use on Floor Type Horiz. Boring Mill, 8'9" long x 17½" wide x 38" high, 2 T slots
Pair Tables for use on Floor Type Horiz. Boring Mill, 8' long x 15¾" wide x 33" high, 2 T slots
Floor Plate consisting of box type Planer Table, 21' long x 48" wide, 12" thick
54"x11' Rectangular Table, 40" high
Rotary Table, 66" dia., made by Ingersoll

VERTICAL BORING MILLS

24" Bullard New Era, m.d.
42" Bullard Spiral Drive, m.d.
42" King, m.d.
48" Colburn, m.d., 2 swivel heads
100" Niles Heavy, m.d., p.r.t.

BROACHING MACHINES

75 H.P. LaPointe Hydraulic Broach, m.d.
Cincinnati Mill Broach, m.d., 10" spindles, new

RADIAL DRILLS

2½' Fosdick, gear box on base
3' American Sensitive, cone
3' American, m.d., box table
4'—13" col. dia. Cincinnati-Bickford Super-Service, m.d., late
8'—17" col. dia. Dreses, gear box, m.d.
Zeus Precision Universal Bench Type Radials, m.d., new

BALL BEARING DRILLS

Canedy-Otto Bench Type, 6" overhang
Allen Bench Type, m.d., ½ H.P., 12" overhang
Mason Bench Type Single Spindle, belt
Providence Engineering Co., Model E, s.p.d.
No. ½, 1, 2 Avey, belted m.d.
No. 1B Edlund, m.d. new
No. 4 Fosdick, 8" overhang, belted m.d., No. 2 Taper
1 spindle Allen, belt drive
2 spindle Allen, belted m.d., 3" overhang
2 spindle Avey, size No. 1 Type B, style VHP, m.d., 8" overhang
2 spindle No. 3 Avey, belted m.d., p.f.
#1LMS—3 spindle Leland & Gifford High Speed, late, m.d.
4 spindle No. 3 Avey, belted m.d., No. 3 Taper, 12" overhang
6 spindle Leland & Gifford, No. 2 Taper, m.d. on each spindle
6 spindle No. 2B Edlund, m.d., No. 2 Taper
6 spindle No. 3 Avey, belted m.d.
6 spindle Henry & Wright, m.d., 15" overhang, No. 2 Taper

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60"x20' NILES-BEMENT-POND Geared Head Engine Lathe, rapid traverse

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No. 3L GISHOLT Turret Lathe, 5 1/16" hole in spindle bar feed, chucks, tooling, AC-MD, 1943

No. 1L GISHOLT Turret Lathe, bar feed, chucks, 1943

No. 2B FOSTER Geared Head Turret Lathe, rapid traverse, AC motors

42" BULLARD New Era Type Vertical Turret Lathe, AC-MD

36" BULLARD Vertical Turret Lathe, converted to Spiral Drive, AC-MD

1½" LANDIS Double Head Bolt Threader, with leadscrews, MD

No. 1 DOUGLAS Plain Horizontal Mill, table 8"x32", power feeds, motor in base, No. 40 taper, new 1942

No. 5 CINCINNATI High Power Horizontal Mill, Timken spindle, No. 50 taper, new 1942

No. 60 NEW BRITAIN Automatic, 6 spindle, 1" capacity, new 1942, completely rebuilt

5'-13" column CARLTON Radial Drill, AC motor on arm, 15 to 1500 RPM

4' AMERICAN High Speed Sensitive Radial Drill 9" column, AC motor on arm

3 Spindle FOSDICK Drill Press, individual AC motors for each spindle, 1942

4 Spindle AVEY MA6 Drill, No. 3 Morse taper, power feeds, AC motor, new 1944

No. 6 TOLEDO O.B.I. Press, 56 Tons

72A5 HEALD Sizematic Internal Grinder

25A HEALD Rotary Surface Grinder, 24" diameter, magnetic chuck

No. 16 BLANCHARD Rotary Surface Grinder, 20HP AC motor on spindle

8'-3/16" CINCINNATI Model 1408 Squaring Shear, new 1949, like new

36"x36"x10' G. A. GRAY Maxi-Service Planer reversing motor drive, box table, rapid traverse

36" OHIO Dreadnaught Shaper, AC-MD

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Chicago 139 CFM. type PB-2., 1947.
Ing-Rand 89 CFM. ES-1- 1947. (2)
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Fellows 612 Spur Gear Shaper
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Cincinnati 24" Back Geared Shaper
Columbia 28" Back Geared Crank Shaper
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Gould & Eberhardt 24" Back Geared Shaper
Gould & Eberhardt 28" Back Geared Crank Shaper
Gould & Eberhardt 32" Back Geared Crank Shaper
Gould & Eberhardt 36H Gear Hobber
Gould & Eberhardt 96H Gear Hobber
Gould & Eberhardt 60BM Gear Rougher
Brown & Sharpe 4-48 Automatic Gear Cutter
Brown & Sharpe #12 Plain Grinder, reversing mechanism
Heald #50 Internal Grinder
Heald 72A3 Internal Plain Grinder
Heald 70A Internal Grinder, late type
Heald 78 Centerless, Internal & Cylindrical Grinder
Jones & Lamson 8 x 31 Thread Grinder
Landis Type C Plain Grinder, 10 x 18, late type
Landis 16" x 72 Plain Cylindrical Grinder
Norton 6 x 18 Surface Grinder
Oliver Template Tool Bit Grinder
Sellers 4T Tool Grinder, late type
Sellers 6T Tool Grinder, late type
Acme #2 Full Universal Turret Lathe, 3¼" hole in spindle
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LeBlond 15" x 8' G.H. Lathe, 9 spindle speeds
Lodge & Shipley 16" x 126" centers, Timken bearing late type, complete with taper attachment
Lodge & Shipley 16" x 6' G.H. Lathe, 12 speeds
Lodge & Shipley 18" x 6' G.H. Lathe, 12 speeds
Lodge & Shipley 20" x 8' G.H. Lathe, 12 speeds
Warner & Swasey 3A Turret Lathe, Geared Head
American 36" x 40' G.H. Internal Face Plate Drive, 16 speeds, 33' center distance, taper attachment
American 48" x 20' G.H., Internal Face Plate Drive, 16 speeds, 120" centers
LeBlond 2½ Universal Mill, 3 SCD, motorized
Milwaukee 1½B Plain Miller, single pulley drive, ready for delivery
Brown & Sharpe #3 Plain Miller, 4 SCD
Hall Style "D" Planetary Miller, late type
Liberty 36"x36"x18' Double Housing Planer, 2 rail and 2 side heads
Niles 84" x 84" x 18' Double Housing Planer, 4 heads, box table, DC reversible drive
Niles 48" x 48" x 16' Double Housing Planer, 4 heads, box table, DC reversible drive
Bliss #37 Coining Press, ¾" stroke, 150 ton
Rassmusen 8 x 6 Power Hack Saw

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#61A Fellows Gear Shaper
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1529
16" Gould & Eberhardt Shaper
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Bausch Multiple Spindle Drill Type W7, Ser. #6837
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Lodge & Shipley Lathe—Serial #29051
22 Ounce Plastic Injection Molder 1946, Serial #47714.
#2 Norton Tool & Cutter Grinder Serial #3355
6D Potter & Johnston Automatic Chucker—Serial #70393

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AUTOMATIC, 1¾"—4 Spin. Gridley Model G
BOLT THREADER, 2" Landis, 2 hds., M.D. (2)
BOLT THREADER, 1½" Reliance Williams
VERT. Attach. for Boring Mach. for 350T G. & L. Mill & Outer Support
BORING MACH., 5" Bar, Betts Floor Type
BORING MACH., 4" Bar, Pawling & Harnischfeger
BORING MACHINE, 3" Bar Lucas, Table Type
BORING MACH., 3" Bar, Lambert Table Type, M.D.
BORING MILLS, 100" Cinci., Heavy, 2 Heads, M.D.
BORING MILL, 72" King, 2 Hds., M.D.
BORING MILL, 60" Colburn, 2 hds.
RADIAL DRILL TABLES, 36" x 20" x 20" (10)
RADIAL DRILL, 6' 15" col. Amer., M-on-Arm
RADIAL DRILL, 5' 15" col. Amer., M-on-Arm, Tri. Purp.
RADIAL DRILL, 5' 14" Col. Amer., M.D.
RADIAL DRILL, 5' Niles, No. 10, M-on-Arm, Late
RADIAL DRILL, 4' Western, M.D. (2)
RADIAL DRILL, 4' 15" Col. Carlton, M-on-Arm, Late
DRILL, 24" Cinci. Bick., Tapping
GEAR CUTTER, No. 13, B. & S. Spur & Bevel
GEAR HOBBER, No. 98H Gould & Eberhardt, M.D.
GEAR PLANER, 11" Reinecker, Bevel, A.C., M.D.
GEAR SHAPERS, Nos. 6 & 75 Fellows
GEAR SHAPERS, Nos. 61A, 64A & 84 Fellows, 1945
GRINDERS, CYL., 10" x 48" Cinci., M.D.
GRINDERS, FACE, 84" Builders, 52" wheel
GRINDER, SURFACE, 14" P. & W. Vert. Spin. B.B.
GRINDERS, UNIV., 12" x 36" Thompson, M.D.
GRINDER, #16Y28 Bryant, Int. 1943
GRINDER, Micro Int. M.D.
GRINDER, No. 6-T Sellers Tool, '42
KEYSEATER, No. 5 Baker, Capacity 4" x 36"
LATHE, 60" x 45' cen. Mackintosh-Hemphill, 1942
LATHES, 42" x 31' cen. Putnam, T. A., M.D.
LATHE, 30" x 22' cen. Bridgeford, 2 Carr., M.D.
LATHE, 36" x 20' cen. Putnam, 2 carr., T.A.
LATHE, 25" x 12' Bed, B & E, T.A. Grd. Hd.
LATHE, 18" x 8' Bed, L. & S. Select Grd. Hd., M.D.
LATHE, 14" x 30" Cen. Monarch, M.D.
TURRET LATHE, 26" Libby, "C" 4½" capty.
TURRET LATHE, 21" Acme Univ., Brass, Late
TURRET LATHE, No. 1B Foster, Univ. 2" capty. (2)
TURRET LATHE, No. 2B Foster, Univ., 3¼" capty.
TURRET LATHE, No. 3 AL Gisholt, 6¼" H. S.
TURRET LATHE, No. 3 Gisholt, Bar & Chuck (3)
TURRET SCREW MACH., No. 4 W. & S., 1½" Bar
THREAD MILLER, 12" x 60" Morey Shield, '43
MILLER, No. 0 Sundstrand Rigidmil Hand
MILLER, No. 2 Van Norman, Duplex, M.D.
MILLER, No. 4B—B. & S. Plain
MILLERS, No. 3 Cinci. Pl. Motorized
MILLER, No. 4 Cinci., High Power Universal
MILLER, No. 5 Cinci., Plain, No. 50 Taper
MILLER, No. 5-48 Cinci., Hydromatic
MILLER, No. 30-H, Sundstrand, Rigidmil
MILLER UNIV., No. 1½ B Special K. & T. M.D.
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PLANER, PLATE, 30" x 1" Cleveland, M.D.
PLANER, 36" x 36" x 14' Whitcomb, 2 Hds., M.D.
PLANER, 24" x 24" x 5' Gray, 1 Hd., M.D.
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PRESS, No. 73½ Bliss S.S., 6" Stroke, 70 ton capty.
PRESS, No. 58, Toledo SS, Grd., 171 Ton capty.
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PRESSES—Hydraulic, 1000-4000 Tons
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MCKAY 1/2" TO 2" FOUR-HIGH LEVELLER, 15" Diameter Rolls, (9) Levelling Rolls, (11) backing up rolls, (2) Pinching rolls, (1) 300 HP motor for main drive, (2) 10 HP motors for screw down and (1) 2 HP motor for pinch roll adjustment.

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ABOVE MACHINES ARE NEW IN 1943, SELLING FOR 1/5 OF NEW COST, USED ONLY 6 MONTHS.

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88 TON, BLISS #4D DOUBLE CRANK, GAP FRAME, 2 1/4" stroke, 38 x 53 1/2" bed area, 9 1/4" shut height.

87 TON, BLISS #4 1/2 STRAIGHT SIDE, 4 1/2" stroke, 21 x 27 bed area. 14 1/2" shut height.

75 TON, WELLS DOUBLE CRANK GAP FRAME, 2" stroke, 20 x 60" bed area, 11 1/8" shut height.

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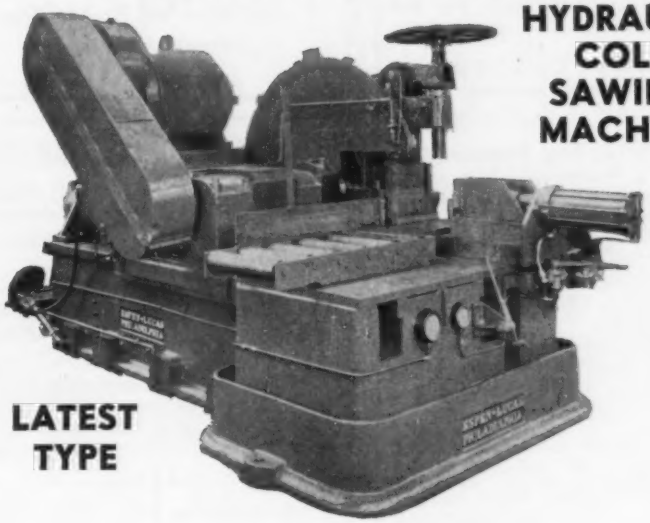

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Southwark Hydraulic Press; Built 1944; Capacity 500 tons; Wt. 53000 Lbs. Moving down type; Bottom platen 64" R to L; 32" F to B; 22" deep; 24" stroke; 78" daylite opening; 22" ram; 4 columns 7" Diam. Oilgear Pump; type DH-15025; output 150 H.P. 2500 P.S.I. G. E. Motor 125 H.P. 3/60/220; 880 R.P.M. With starting equipment and controls.

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All Presses rebuilt and guaranteed

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2000# Clark Low Lift Platform Truck
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All machines fully guaranteed.

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ROLLING MILL, 16" x 20" Farrel, 2 high.
COMPRESSOR, 100#, 10 x 9 Penna., 240 CFM, 40 HP AC.
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3/16 x 60 x 240
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1/4 x 60 x 198
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1/2 x 60 x 240
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Reinforcing Bars 5/8" to 1"
Equal and Unequal Leg Angles
Flats and Rounds 1/4" to 5"

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"Water Hardening—Ground & Polished"

Size	Length	Weight
.063	12′	115#
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.134	12′	510#
.150	12′	364#
.154	12′	331#
.161	12′	1120#
.178	12′	1125#
.248	12′	252#
.257	12′	518#
.281	12′	1121#
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.4375	12′	289#

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42" SPIRAL DRIVE
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10,000# Wtby 80′ draw-20HP vari speed Chain type; $7000.
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5' 15" col. Amer. Tri. Pur., M-on-Arm
5' 14" col. Amer. Tri. Purp., Gear Box
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48" x 20' bed Amer., M.D., T.A.
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20" Bement Miles, M.D.

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GG 19 Gear Grinders (2)
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2½ ton Niles span 27' 1" AC
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No. 2C Lewis Wire Straightener & Cut-off.

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4***	1500	Whse.	Encl. (Rev.)	600
4***	1200	Whse.	Encl. (Rev.)	600
4***	800	Whse.	Encl. (Rev.)	600
1	350	G.E.	CD-169-A	1150
1	280/350	El. Dy.	No. 22	400/1200
1	250	G.E.	MPC	325/975
1***	200	G.E.	MPC	500/1200
1	200	Whse.	Mill	300/1200
1	180	G.E.	MPC	400
1*	150	C.W.	83-H	800
1***	125	Whse.	SK-190	600
2	125	Whse.	SK-184	575/850
1	90/160	G.E.	MPC	625/1125
1	50	Whse.	SK	500/1500
1	50	Whse.	SK	250/1000
1	40	Whse.	SK-140	500/1700
1	35	G.E.	RF-14	500/1500
1	35	G.E.	CD-125	400/1200
1	35	G.E.	CD-147	300/1200
1	35	Rel.	35P	250/1000
1	32½	Whse.	SK-150	400/1200
1*	30/75	Whse.	SK-151L	400/1200
1	30	Al. Ch	E-145	400/1200
1	30	G.E.	CDM-105	375/1750
2	27½	El. Dy.	15S	450/1350
1	25	Whse.	SK-123	500/1500
1	25	G.E.	RF-13	400/1600
1	25	Whse.	SK-140	400/1200
1	25	G.E.	CD-123	400/1200
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All above 230-VDC except where marked ***
***—Pedestal bearing mill design 525/600-VDC.
Rev.—designed for mill reversing service.
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MOTOR GENERATOR SETS

Qu.	K.W.	Make	RPM	Volts DC	Volts AC
1	2400 (3-U)	Al. Ch.	720	525	4300
1	2400 (3-U)	Whse.	720	600	4800/2400
1	1000	G.E.	514	550	2300
2	500	C.W.	720	575	2300/440
1*	500	C.W.	720	250/275	2300/440
1	500 (3-U)	Whse.	1200	250	440
1	300	Al. Ch.	1200	250	2300
1	250	Whse.	1200	125/250	2300
1	200	Whse.	1200	125/250	2300/440
1	200	Ridgway	900	275	2200
1	155	G.E.	720	250	2300/440
1	150	G.E.	1200	500	2300/440
1	100	Al. Ch.	1200	125/250	4000/2300
1	100	Delco	1200	125/250	440/220
1	100	C.W.	1200	125	440/220
1	100	Ridgway	1200	275	4000/2300
1	85	C.W.	1200	250	4000/2300
1	75	Star	1200	230	440/220
1	75	Whse.	900	75	2200
1	75	Al. Ch.	900	250	2300
1	50	Burke	1750	250	440/220
1	35	Whse.	1750	250	440/220
1	25	Ideal	1750	125	220
3	20	Al. Ch.	1200	250	440/220

SLIP RING MOTORS—CONSTANT DUTY

3-Phase, 60-Cycle

Qu.	H.P.	Make	Type	Volts	RPM
1**	1800	G.E.	MT-498	2300	352
1**	1200	G.E.	MT-26	2200	275
2**	1000	Al. Ch.	ANY	2200	235
1**	600	G.E.	MT-20	2300	360
2	500	G.E.	I-16-M	2300	450

Qu.	H.P.	Make	Type	Volts	RPM
1	400	Al. Ch.	ANY	2200	514
2	400	G.E.	MT-412	2200	450
1	300	Al. Ch.	ANY	2300	514
1	250	Al. Ch.	ANY	440	720
1	250	G.E.	MT-414	2200	300
1	200	G.E.	I-16-M	2200	600
1	150	G.E.	I-13-M	2200	1750
1	125	Whse.	CW-870	2200	900
1	100	F.M.	H2OC	440	900
2	100	G.E.	I-15-M	2300	514
1	75	Whse.	CW-7540	440	720
1	60	Whse.	C.W.	440	900
1	50	G.E.	MT-536	220p	1200

TRANSFORMERS—Power

Qu.	Make	KVA	Type	Phase	Voltage
1	G.E.	2760	DH	3	7300/6900-240/480
4	G.E.	333	H	1	13200/1100-2200
3	Packard	250	A	1	13200-2200
3	G.E.	100	H	1	23000-2300
3	Whse.	100	Auto		4160/2400-2400/-1385
3	Al. Ch.	50	OISC	1	22000-220
2	Uptegraff	37½	HD		2300-115/230
2	Kuhlman	13	Dry	1	480-240
45 (new)	Al. Ch.	3	OISC	1	2400-120/240

FREQUENCY CONVERTER SETS

1	750-KVA	Elec. Mchy.	440/3/60 to 440/3/180
2	1200-KW	G.E.	2300/3/60 to 460/3/30
1	1700-KVA	Whse.	2300/3/60 to 2300/3/24

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3	500	G.E.	M-574-Y	6600	900
1	500	G.E.	IP	550	505
1	350	G.E.	MT-442Y	2200/4000	252
1	300	Al. Ch.		2300	505
1	300	Al. Ch.		440/2300	705
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1	250	G.E.	MT-5598	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
2	200	G.E.	IM-17	550	585
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150 (unused)	Whse.	CW	2300	435
1	125	Al. Ch.		440	720
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1	200	G.E.	IK	440	865
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1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440	900/450
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70 ton Flat Cars 40'6" std. ga.
50 ton Flat Cars 72' std. ga.
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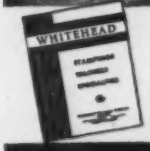

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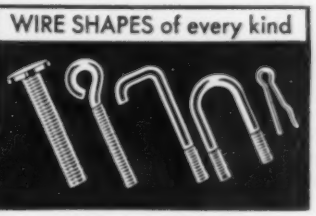

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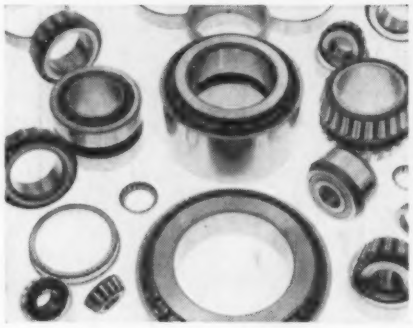

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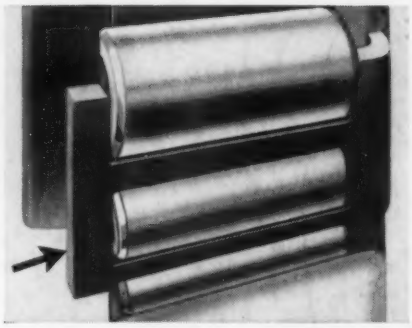
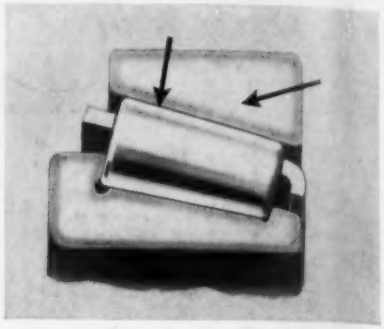


SOFT STEEL CAGE separates the rollers in Timken tapered roller bearings and prevents scuffing.



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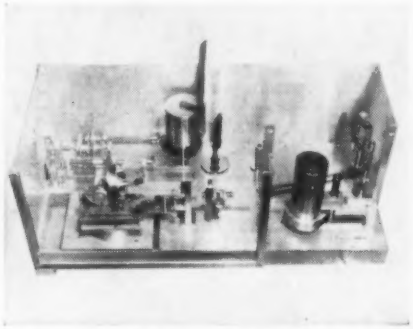
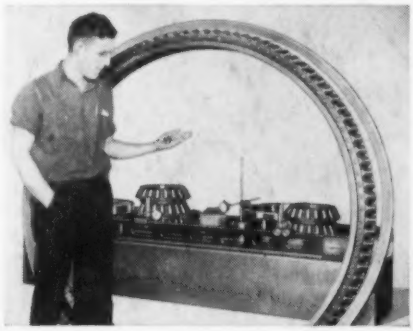
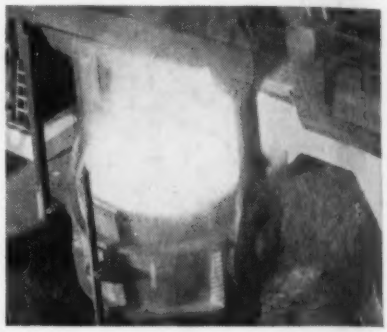


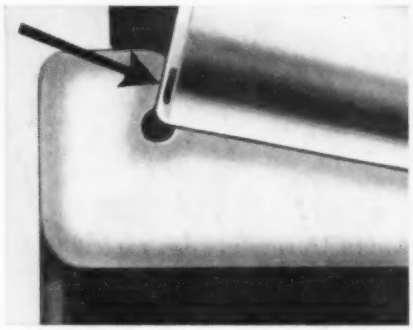
MICRO-INCH FINISH. With help of the profilograph, which measures surface irregularities to a millionth of an inch, the Timken Company has developed a bearing finish of micro-inch accuracy.



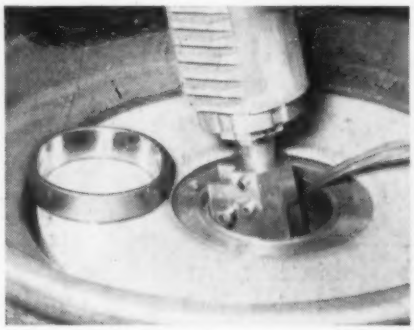
5850 SIZES. If you need a tapered roller bearing smaller around than your finger or as large as 71½" in diameter, you can get it from The Timken Roller Bearing Company.



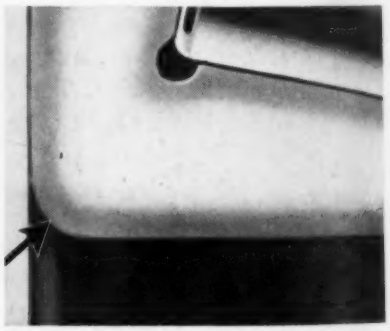
WE MAKE OUR OWN STEEL. Because Timken bearings are made of special alloy steel, produced in the Timken Company's own mills, they have extra strength and wear resistance.



RIB OF CONE maintains roller alignment, prevents skewing, assures maximum bearing capacity.



PRECISION MANUFACTURE makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.



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